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THE TREATMENT OF STENOSIS OF THE LARYNX AND TRACHEA FOLLOWING DIPHTHERIA.*

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The different types entering into the causation of chronic stenosis of the larynx and trachea following diphtheria should be classified as follows: (1) Neurotic; (2) Spasmodic; (3) Traumatic; (4) Pathologic.

Neurotic. There is a marked neurotic element which accompanies all cases of laryngo-tracheal stenosis. The impending fear of having an intubation tube or tracheal canula removed promotes a stage of excitement, especially in children, often bordering on convulsions. The passive congestion caused by the crying and struggling child adds greatly to the difficulty and invariably makes reintubation or recanulation necessary from glottic spasm, subglottic and tracheal edema. In many instances in adults this form of "neurotic shock" may be in equal proportion to that encountered in children. As it is so much easier for a child to breathe through the lumen of a properly fitting intubation tube or tracheal canula, the fright which naturally follows when the tube is removed, as respiration seems to be much more difficult to the child than with the tube in situ, often makes detubation and decanulation extremely difficult. This diffi-

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culty is frequently encountered in cases in whom the larynx is quite patent when examined by a bronchoscope.

The children will often run away from the nurse and hide when they are told that their tubes are to be changed. Many of them, perhaps, often go to the operating table with the fear that their death warrant is about to be signed. There is apparently a vicious circle which should be considered with this "chronic neurotic fear" of impending accident. Venous passive congestion promotes subglottic and tracheal edema and gradual asphyxiation; and the fear of asphyxiation keeps up the ever active neurotic element.

All of these conditions taken together make the final cure of the case at times an extremely discouraging problem.

Spasmodic. Spasm of the glottis is usually the result of the wearing of an intubation tube for a long period, especially when the neck of the tube is too thick, as it holds the cords in a state of fixation or functional disuse. The wide neck tube virtually acts as a splint to the intralaryngeal muscles and disturbs the balance of power between the two opposing sets of muscles, the adductors and abductors. The abductors have become fatigued from the long continued inability to act during the period of intubation while the adductors, which have not been affected, readily act on the removal of the tube and adductor spasm is the natural result.

Supraglottic and arytenoid edema may also contribute to the rapid closure of the glottic aperature.

To overcome pure spasm of the adductors (closers of the vocal cords) an extremely narrow neck tube with a long antero-posterior lumen should be used. This type of tube allows for some movement of the vocal cords, as well as re-education of the posticus muscle so that the cords can separate while the tube is in situ. The writer has overcome pure glottic spasm in a number of cases by the use of his cut-out flat-head posticus tubes. The tubes are cut out in the posterior portion of the lumen and allow for free play of the posticus muscle and arytenoid cartilages. With the use of these tubes persistent adductor spasm is readily overcome. On other cases in whom digital intubation has been constantly performed, the writer has been able to deceive the patient by removing the tube by direct inspection and immediately introducing a small tracheoscope or bronchoscope between the cords. After a few minutes the tracheoscope, which has been giving a free passage of air, is gradually withdrawn to see the result. If subglottic edema is not one of the causes of the stenosis the partial separation of the cords on the first attempt at

inspiration will give sufficient room for easy respiration, and as soon as this is seen to be the case the direct speculum through which the larynx has been studied is removed and the child almost invariably remains permanently detubated. These cases have become accustomed to the digital method of removal of the tube as practiced by Dr. O'Dwyer, but as they are not aware of what is being done by direct means, the neurotic spasm element is overcome with gratifying results. The writer can recall a number of children who were permanently detubated by this method. Several of these children were not aware that their tubes had been removed, and if any of the nurses or doctors would ask them if they wanted the tubes removed they would immediately become greatly excited and very dyspneic. In one instance, a little infant of one and one-half years who had been detubated by the direct method and had breathed quite naturally for a period of eight days, was suddenly thrown into a frenzy when he recognized the O'Dwyer instruments which were kept on the table next to his crib for emergency purposes, so that the nurse sent in a "hurry call" as she feared reintubation may be necessary. The fright and crying of the child brought about sufficient passive congestion and glottic spasm to make him dyspneic, but reintubation was not necessary and the child made a perfect recovery. The citation of these cases only goes to prove that children at almost any age soon become accustomed to the manner in which the tube is removed, and also become easily frightened when the original method of tubal removal is attempted from time to time to effect a cure of the patient. The cut-out flat-head posticus tubes should never be used when polypoid tissue is present. Practicing direct means as a cure for adductor spasm after the introduction of a tracheoscope is of little or no value when supraglottic or subglottic edema is present, but it is of great value and has been very advantageous in the writer's hands in pure glottic spasm. Tracheotomy as advised by Dr. Jackson will also overcome the spasm element with gratifying results.

Traumatic: (a) *Intubational.*—Faulty intubation is often one of the primary causes of chronic post-diphtheritic stenosis, especially when the unfortunate false passage is made into the larynx by the hand of the unskilled intubator. It is not infrequent for the writer when examining the larynx by direct inspection to see the hole which has been driven into the laryngeal ventricle, or a fracture of the cricoid cartilage, or a dislocation of one arytenoid cartilage, or both. The attempt at digital intubation has at times been made with such force that the end of the tube has been driven through the

cartilage and out into the tissues of the neck. (Fig. 2, *a* and *b*.) Such false passages are almost invariably fatal from mediastinal infection. However, the writer can recall five instances of false passage into the laryngeal ventricle, one of whom had a generalized subcutaneous emphysema following the accident. All of these cases recovered after the tube was introduced into the larynx under direct vision. The writer has also noted tracheoscopically intubation ulcers when the retention swell at the cricoid cartilage was too thick for the narrow lumen at that level. Tubal pressure, together with the necrotic infiltrative diphtheritic process, he feels, is responsible for necrosis of the cricoid cartilage and therefore, he prefers using a long, narrow lumen tube with a bulbous tracheal end (Fig. 24, b) to avoid pressure on the cricoid cartilage.

For anyone to make a false passage into the larynx with an intubation tube in these days of direct laryngeal intubation is inexcusable. Far less damage can be caused by tracheotomy even when not performed in the median line, than by one attempt at intubation when an effort is made to drive the tube in at all hazards.

(b) *Tracheotomic.* Chronic laryngeal stenosis has followed tracheotomy just as frequently as it has followed intubation. (Fig. 1.) While ulcerations occur in the trachea from the constant movement of the end of the intubation tube (Figs. 3, 4, 5 and 6), they are seldom deep enough to cause necrosis of the cartilage, though villous fungating polypoid granulations are frequently produced in this locality (Fig. 21.) The unfortunate thing is, that tracheotomy is often performed too late and is made a stab emergency operation. When there is necessity to reintubate a case that has been without a tube, tracheotomy should be thought of first rather than last as the best means of relieving dyspnea and saving the life of the child. Reintubation in such cases is frequently impossible by the hand of the most skillful intubator, even though he uses small special tubes in attempting to enter the stenosed larynx. One such attempt at intubation may shut off the one millimeter of air space in the larynx through which the child is breathing, and the emergency tracheotomy may be of little aid.

We have had cases admitted to the Willard Parker and Kingston Avenue Hospitals on whom an emergency tracheotomy had saved the life of the child, but the subsequent contraction of the many stab wounds made several of them cases of difficult tracheal stenosis. The so-called high tracheotomy is most frequently performed in the emergency, as well as transverse incisions even into the thyroid cartilage.

In one case a transverse thyrotomy in the emergency severed the anterior commissure of the vocal cords. In the rapid stab emergency tracheotomy the knife blade is frequently used with such pressure that the posterior tracheal wall is severed and the incision carried into the esophagus resulting in a very bothersome tracheo-esophageal fistula. Many incisions and cutting off of portions of the cartilaginous rings, as well as fracturing and denuding the tracheal rings by the rapid introduction of the dilating forceps, will be followed by subsequent contraction and render the case difficult to cure. Tracheotomy, when performed properly and with plenty of time, is one of the most life-saving operations which we have in surgery. But, unfortunately, the stab emergency tracheotomy has been responsible for much of the high mortality rate and the demise is attributed to the tracheotomy when, in fact, in many instances, the tissues of the neck are severed only and the trachea never even opened.

The writer believes that tracheal canula ulcerations are extremely rare, even with the old style fenestrated canula. Anterior and posterior spur formations are frequent, especially when an oversize canula is used which prevents air from passing into the larynx. The writer has never seen a properly fitting undersize intubation tube or tracheal canula do any harm, and it is doubtful if they are ever a source of trouble when introduced properly, no matter how many times the procedure may be necessary.

(c) *Operative.* When thyrotomy and crico-thyrotomy for the removal of cicatricial webs, bands or adhesions and laryngeal eviceration were performed and the fistula allowed to granulate over an intubational tube, very dense cicatricial scars were the result. These very dense masses of cicatricial tissue would continue to contract indefinitely and invariably resulted in further stenosis which necessitated further operative measures, such as laryngostomy, before the patient was cured. Also attempts at plastic operations on tracheal fistulae, resection of cartilage and even attempts at tracheostomy when there was stenosis present above the canula. Such operative procedures, fortunately, have been abandoned and much more rational measures resorted to at the present time.

Pathologic. The whole of the pathology of stenosis of the larynx and trachea following diphtheria is laid down in the beginning with the acute diphtheritic process. Diphtheria is a dissecting necrotic disease, and upon the duration of the disease and the degree of involvement of the larynx and trachea depend the subsequent changes which occur in these localities. The writer has collected ten cases of laryngeal diphtheria which responded so readily to antitoxin that

intubation was not necessary to relieve the stenosis. All of these cases became dyspneic from seven to ten days after the primary diphtheritic process had subsided, and all of them who had never required intubation to relieve the diphtheritic stenosis, now required intubation to relieve the stenotic lesion following diphtheria. Some of them were thought to be reinfected by diphtheria, but direct laryngeal views revealed the ever present subglottic edema. This only goes to prove that upon the degree and duration of the diphtheritic process depends the amount of infiltrative involvement of the laryngeal structures. Nevertheless, the writer feels that while the inevitable nature of the pathological process plays a very important part in all of the cases, at the same time traumatism and injury by instrumental means for the relief of the stenosis is also largely a contributing factor.

The following pathological lesions which may be either supraglottic, subglottic, or both, are usually present in the hyperplastic and cicatricial types of chronic stenosis which prevent detubation or decanulation: (a) Edema; (b) Polypoid masses; (c) Decubitus ulcers, intubational or canula; (d) Paralysis (crico-arytenoid ankylosis); (e) Perichondritis; (f) Chondritis; (g) Metaplasia; (h) Endochondral bone formation.

(a) *Edema.* Edema, when supraglottic, usually involves the glosso-epiglottic fold and the ventricular bands. It is usually anterior and is caused at times by the head of the intubation tube being too large or angular where it joins the neck of the tube. The aryepiglottic folds and the arytenoid cartilages may also show signs of marked infiltration and become enormously tumescent. The edema is somewhat similar to the ordinary types of edema from other infectious causes, but it is much more firm and has a tendency to close the laryngeal lumen and cause much more difficulty with inspiration than with expiration.

This form of inspiratory dyspnea is largely due to the greatly thickened ventricular bands which come together as soon as the tube is removed, as they are sucked inward and almost completely close the laryngeal aperture with each attempt at inspiration. When the edema also involves the arytenoid cartilages it is a useless procedure to attempt to remove the intubation tube for the supraglottic and arytenoid edema will necessitate immediate reintubation. When the cause of the edema is due to the head of the tube, the head should be changed and a very flat head tube introduced so that the narrow neck of the tube comes in contact with

the ventricular bands and relieves pressure in this locality. Gentle galvano-puncture will also be of great aid in relieving this condition.

When the edema is confined to the subglottic region the galvano-cautery will not only relieve the condition and make it entirely disappear, but will invariably cure the great majority of cases. With care the cords should not be cauterized and the small scar that remains in the cricoid does no harm nor is there subsequent contraction following after the scar has healed. The writer does not perform tracheotomy as a preliminary measure when the subglottic space is to be cauterized. He prefers using a small tracheoscope with a long slanting end. A very fine cautery and carrier similar to a light carrier is introduced through the tube and is controlled under direct vision (Fig. 23, b). As there is always some reaction following cauterization he prefers reintubation of the patient, using a tube with a very flat head and narrow neck with an olive bulbous tracheal retention swell. So far, with this method, the writer has had great success and has seldom failed to cure a case of subglottic stenosis, though many of them require repeated applications of the cautery before they remain permanently cured. The great advantage of tracheoscopic cauterization is, first, that one is able to make direct application to the subglottic area, and, secondly, that respiration is not obstructed and the child breathes quite naturally while the application is being made.

In cases of tracheal fistula, edema may occur in a manner quite similar to that encountered in the larynx, and therefore, make final decanulation difficult. Careful cauterization through a tracheoscope from the tracheal fistula upward will greatly decrease the edematous spur formation and be of material aid in the final cure of the case.

(b) *Polypoid masses* may be supraglottic in retained tube cases (Fig. 8), but they are also found in the cricoid region, especially following perichondritis. They also occur in the trachea at the site of the tracheal fistula as villous polypoid masses. These polypoid masses are composed of new connective tissue and are freely supplied with blood vessels and are very vascular.

When they are supraglottic they become very edematous and act in a manner similar to supraglottic edema by causing immediate obstruction to respiration. Polypoid tufts are most frequently found on the ventricular bands and at the base of the epiglottis. They may fill the whole of the anterior portion of the larynx. They are very firm and fibrous and at times are difficult to remove en masse. At times they are made up of small grape-like bunches

of this tissue with a single blood vessel as the stem. The anterior polypoid masses which hang over the lumen of the tube and causes valve-like obstruction to inspiration should be removed while the tube is in situ to make sure that there will be no further difficulty with inspiration. In one case of this type which bothered all of us in ascertaining the cause of the inspiratory difficulty with the tube in the larynx, even by direct inspection, we finally saw that a mass of polypoid tissue which was springing from the base of the epiglottis was covered each time the spatula raised the epiglottis and this was the reason why we had not seen the mass at previous examinations. This bunch of tissue was easily removed with the snare and there was no further difficulty with inspiration after its removal. The child was detubated one week later and remained without the tube permanently. In any case all of the polypoid tissue should be removed by snare or punch forceps and the base cauterized by the galvano-cautery.

(c) *Decubitus ulcers.*—These so-called "bed sore" ulcers, due to the intubation tube or tracheal canula, are rather rare in the writer's experience when a proper fitting and smooth under-sized intubation tube or tracheal canula is used, no matter how many times they have to be changed. These ulcers do occur, however, and are rather frequent, especially in the severe cases seen in hospital practice complicated by cricoid perichondritis and persistent auto-extubation of the tube, particularly when over-size tubes with a large retaining swell are used in an endeavor to stop the constant coughing up of the tube. The writer's non-cough-up tubes with a bulbous tracheal swell will in every instance put a stop to persistent auto-extubation, and at the same time cause no pressure on the cricoid cartilage in which locality these ulcers are most frequent.

(d) *Paralysis* (*crico-arytenoid ankylosis*).—Post-diphtheritic paralysis of the motor nerves of the larynx is an extremely rare condition. This certainly has been our experience in the study of the post-diphtheritic paralysis in all severe cases of post-nasal and glandular diphtheria on whom intubation and tracheotomy had never been performed, and who had no laryngeal involvement. In many laryngeal cases crico-arytenoid ankylosis and infiltrations binding down the cords have been frequently mistaken for paralysis and reported as such, when in fact, no paralysis, toxic or from tubal pressure, could be recognized pathologically. Dr. Ira Van Giesen and the writer were able to definitely prove by histological sections

of the recurrent laryngeal nerves that there was no involvement of the trunk of the nerve as it entered the larynx, nor was there round cell infiltration or thickening about the muscular branches. In over fifty cases in whom there had been extensive perichondritis at the cricoid level, the trunk nerve and muscular branches were found to be normal in each instance from the histological findings. On the other hand, Dr. Archibald Dickson and the writer examined clinically by direct means 100 cases of severe nasal and pharyngeal diphtheria with toxic post-diphtheritic paralysis, and in each instance the motor nerve of the larynx was seen to be in good working order. The superior laryngeal nerve was involved, however, in ninety per cent of the cases ,and the speculum and bronchoscope could be introduced without discomfort to the patient, for there was profound local anesthesia present quite similar to that produced by cocain. The great majority of cases examined were in adults. These patients had considerable difficulty in coughing up thick tenaceous mucus which would collect in the larynx, for the explosive cough reflex was lost. The act of coughing was accompanied by a prolonged nasal grunting sound at each effort to expel the secretion. There is a vasomotor paresis probably of the lung as well in many of these cases, and their inability to cough out secretion causes a damming back of secretion in the lung and the patient succumbs to a terminal pneumonia. To use the words of Jackson, "the patient practically drowns in his own secretions."

(e) *Perichondritis and chondritis.*—In the severe types of laryngeal diphtheria, perichondritis and chondritis especially at the cricoid level are the chief factors in causing persistent coughing-up of the intubation tube. Frequently, peri-laryngeal abscesses give the first warning that the cartilage is becoming destroyed and that the infection has involved the crico-thyroid lymph node.

Following this the tube may be rapidly dislodged. It is not infrequent to have a tube coughed up as many as ten times during the twenty-four hours. In one instance, the writer recorded a case where the tube had been auto-extubated as many as 32 times in 24 hours. Tracheotomy was finally performed, and the child passed away the following morning. The whole larynx was one mass of slough, and very little cartilage remained to show where the larynx once existed. The arytenoid cartilages may also become involved by the extension of the infection and become necrotic. In one case, peri-laryngeal infiltration made its appearance, and

the region of the neck was poulticed with the intention of evacuating the abscess the following morning. In the morning, the swelling in the neck had completely disappeared, but there was a profuse discharge of pus from the mouth, as the child was old enough to cough it out as it trickeled into the lumen of the tube. On making a direct examination it was noted that there was a small perforation in the mucous membrane of an enormously swollen right arytenoid cartilage from which pus was constantly oozing, the peri-laryngeal abscess having been evacuated through the arytenoid perforation. The area in the neck over which the abscess had made its appearance the day before was incised and the cavity drained properly. Pus ceased to drain from the arytenoid the following day. The child recovered, but was one of the difficult cases of laryngeal stenosis to cure.

In the great majority of the histories of post-diphtheritic laryngeal stenosis one will find that there has been a period from the first to the fourth week after the primary diphtheritic infection of persistent auto-extubation. The severe cases who recover, or rather are tided over this period of auto-extubation, invariably become chronic. Unfortunately, many of them succumb to bronchopneumonia, which is, in fact, foreign body pneumonia from aspiration of infectious sloughs of cartilage that have fallen into the lung. After the destruction of the cartilage, the thin areas of perichondrium which remain endeavor to build up the support at the cricoid cartilage and nature's process of repair converts the cricoid ring into one of partial bony development.

(g) *Metaplasia.*—In the thyroid cartilage it was not infrequent for Dr. Van Giesen to find areas of metaplasia with new formations projecting into the lumen of the larynx. In other words, there may be metaplastic bony spurs projecting into the lumen. The ankylotic crico-arytenoid joints are frequently of bony origin, especially where there has been destruction of the posterior segment of the cartilaginous cricoid ring.

(h) *Endochondral bone formation.*—Metaplastic and endochondral bony formations occur in almost all of the cases when there has been extensive chondritis and perichondritis.

In four specimens of chronic stenosis we found bony deposits in all of the cartilages, and in one there was almost complete regeneration of the cricoid cartilage by a metaplastic and endochon-

dral bony ring (Fig. 20). The muscles of the larynx, strange as it may seem, are all intact, but are distorted and out of place. All of them show some myocitis, but not in the great degree as one would suppose after having read the rather complex pathology.

The whole of the surface of the larynx and trachea is covered with epithelium in spite of the pathological changes and the endo-laryngeal and thyrotomic methods of treatment and long-continued duration of intubational or tracheal canula tubage. In the larynx the epithelium is of the transitional and stratified squamous varieties. While in the trachea the epithelium is cuboidal, but is also absent in places. This absence of epithelium in places may have been due to rubbing off of the epithelium by the manipulation of the specimen. Those of you who are familiar with the handling of laryngeal specimens know how easy it is to brush off the epithelium. We could find no columnar ciliated epithelium present.

In spite of the many changes which occur in the larynx in post-diphtheritic laryngo-tracheal stenosis the writer believes that all of the cases are not hopeless and that the great majority of them, if not all of them, if given sufficient time and patience, can be cured.

For the hypertrophic supraglottic and subglottic types of short duration, galvano-caustic applications will be of the greatest aid and will invariably cure the great majority of the cases.

All of the different types should be studied by direct means, and one should never attempt to examine the larynx in any case of stenosis unless everything is prepared for an emergency; that is, the operator must have suitable bronchoscopes, tracheotomy instruments and digital intubation apparatus at hand, should direct measures fail.

As a rule, however, it is not a difficult procedure to examine the larynx and remove an intubation tube through the writer's direct intubation speculum as well as replace it if necessary, but no case is ever examined in our clinic unless everything is in readiness for an emergency.

Intubational dilatation has been very satisfactory in the treatment of the hypertrophic and cicatricial types, but great care is necessary not to over-dilate the larynx, as perichondritis may result and add to the stenosis, and make the case more difficult to cure. For cicatricial webs, especially with not more than one millimeter of space for breathing purposes, Dr. Gover and the writer

prefer performing tracheotomy first, before any attempt is made by endolaryngeal treatment. After treacheotomy we have had good results by the use of tracheoscopic cauterization, both from above downward and from the tracheal fistula upward. Great care should be used in performing tracheoscopic cauterization that the cicatrix be cut with the cautery knife antero-posteriorly and not too deep laterally. The anterior commissure of the cords when shortened can be beautifully lengthened by an anterior cautery cut, especially when there is good arytenoid mobility. In one case perichondritis was caused by the caustic application being carried too deep into the lateral walls. This was before the use of guided tracheoscopic cautery application and was performed with one of the older silk wound cautery prints.

It has always been the rule of the writer to try all of the simplest methods first to cure the individual case before any radical procedure is attempted. The great majority of our cases have been cured after some endolaryngeal methods and gradual dilatation. We have also employed soft rubber covered intubation tubes which have proven to be satisfactory, as the soft rubber has a very beneficial effect on scar tissue. In cases with dense masses of fungating polypoid tissue in the region of the cricoid cartilage, or with complete laryngo-tracheal stenosis, or extensive destruction of the laryngeal cartilages, laryngostomy is the best and only means of curing this type of case.

The voice.—In the experience of the writer the voice has been much better in all cases cured by intubational dilatation, provided narrow-neck tubes were used also to allow for motion of the cords and prevent crico-arytenoid fixation, that it has ever been following laryngostomy. This is, therefore, one of the main reasons why intubational dilatation is given a thorough trial first. Again, in closing, the writer wishes to emphasize the fact that he believes all of the cases of chronic stenosis of the larynx can be cured, but much time and patience is frequently required before the desired result is accomplished.

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DESCRIPTION OF ILLUSTRATIONS.

Fig. 1. Shows a mass of diphtheritic membrane involving the whole of the cavity of the larynx, and also the reason why laryngeal stenosis follows tracheotomy quite as frequently as it follows intubation. Had this patient recovered, the dense cicatricial contraction following the healing of the necrotic diphtheritic lesion would have made the case one of difficult stenosis above the canula.

Fig. 2. (a) Shows one of the unfortunate accidents following unskilled attempts at digital intubation. Note the fracture of the cricoid cartilage into which the tube has been driven by great force, and also the high tracheotomy performed in the emergency. (b) Shows a similar accident and by far the most frequent. The tube has been driven into the laryngeal ventricle and has torn the soft tissues of the larynx from the cartilage and then the end driven back into the larynx. It must have taken an enormous amount of force by digital intubation to produce such traumatism. The round spot in the trachea is the emergency tracheal fistula performed in a dangerous locality and well to the right of the median line. The child lived for ten days after tracheotomy but succumbed to mediastinal infection and pneumonia.

Fig. 3. Shows the beginning of the so-called "laryngeal bed sores" usually produced by an oversized retention swell on the intubation tube. This is the first stage of auto-extubation. Note the ulceration at the site of the cricothyroid membrane which is the cause of the infection reaching the crico-thyroid lymph node producing perilaryngeal infiltration and abscess.

Fig. 4. (a) Complete perichondritis of the whole of the cricoid and part of the thyroid cartilage two weeks after the primary diphtheritic infection. This was one of the persistent auto-extubation types. The bulbous tracheal non-cough-up tube put a stop to auto-extubation. (b) Shows the recurrent laryngeal nerve and its muscular branches to be intact and free from infiltration even with such necrosis of the cricoid cartilage. (c) Shows a high power microphotograph of the main trunk nerve.

Fig. 5. (a) This photograph shows the complete necrosis of the cricoid cartilage and tubal tracheal ulcerations. Portions of the necrotic cricoid have sloughed out and fallen into the lung, setting up an infectious foreign body pneumonia. (b) Microphotograph of histopathological section of the right recurrent laryngeal nerve as it enters the larynx. Note the angle of entrance between the normal inferior cornu of the thyroid cartilage above and the necrotic cricoid to the right and below. The laryngeal lumen to the left is lined with necrotic polypoid tissue. (c) A high power magnification of the trunk nerve and muscular branches. There are areas of necrotic tissue about the main trunk nerve and branches, but there is no involvement of the neurilemma or bundle of nerve fibers within the sheath.

Fig. 6. Shows complete necrosis of the cricoid level in a case of four weeks duration. This was one of the persistent auto-extubation types which succumbed to the usual foreign body pneumonia.

Fig. 7. Represents one of the types of hypertrophic and cicatricial stenosis. It also demonstrates what follows a laryngo-fissure operation when the laryngeal fissure is allowed to granulate over an intubation tube. This was one of the former methods of treating laryngeal stenosis, but the procedure was seldom followed by gratifying results. Note the absence of the cricoid cartilage partially replaced by bony formation, which is usual in the early auto-extubation period. The very dense cicatrix caused complete stenosis and the stab emergency tracheotomy was unsuccessful. The patient had worn a tube for two years and after detubation of two months following laryngotomy was discharged from the hospital as cured and succumbed one month later.

Fig. 8. Demonstrates another type of supraglottic and subglottic stenosis with dense cicatricial bands of connective tissue in the larynx and trachea. Also note the posterior tracheal spur formation and the pulling forward of the lateral tracheal wall following partial dermatization of the fistula. The specimen was opened on the anterior wall to show the tracheal hypertrophy and the distortion of the trachea and larynx produced in persistent tracheal canula cases.

Fig. 9. Demonstrates in this gross specimen what can occur when oversize dilating tubes are used in an early case of only two months' duration. The child was tracheotomized for acute diphtheritic stenosis, and complete cricoid stenosis was the result owing to the high tracheotomy and diphtheritic necrosis. The mass of granulation tissue in the lower portion of the cricoid cartilage is the result of the high tracheotomy.

Fig. 10. A specimen of a case of persistent subglottic edema of two months' duration. Too deep galvano-cauterization in this case set up perichondritis. The cricoid is plainly shown to be divided on either side. The subglottic region just above the cicatricial ulcer is quite edematous. This was one of the author's early cases and cauterization was not performed through the tracheoscope.

Fig. 11. A case of perilaryngeal abscess in an acute type of diphtheritic stenosis one week after primary intubation. This is often the first warning of crico-thyroid ulceration and beginning perichondritis. The infection involves the crico-thyroid lymph node and an abscess is the result. This case recovered after the evacuation of the abscess.

Fig. 12. Shows the superficial and deep lymphatic circulation of the neck. One small lymph node which the writer has termed the crico-thyroid lymph node can be seen lying on the crico-thyroid membrane. This is the node which is involved in perilaryngeal abscess. (After Testut.)

Fig. 13. Histopathological section taken from a case of acute laryngeal diphtheria of four days' duration. The upper layer is the dense layer of coagulation necrosis and the mucous membrane is necrotic in places. The next layer is composed of a finely meshed fibrin network containing leucocytes and numerous fibroblasts. In the center there is marked proliferation of small round cells, meshes of fibrin and leucocytes, and red blood corpuscles. Note the very dense area of small round cell infiltration extending down through the mucosa and submucosa. Numerous blood vessels and mucous glands are cut across in the section.

Fig. 14. Represents a histopathological section through the thyroid cartilage just above the vocal cords. There is a zone of very dense connective and infiltrated tissue which surrounds the lumen. In the upper right hand corner the thyroid cartilage shows marked signs of metaplasia with a spur projection into the lumen. The muscles are present but show some signs of myocitis. The left arytenoid cartilage has probably been dislocated and does not show in the specimen. Numerous mucous glands and blood vessels surround the lumen.

Fig. 15. (a) Shows a transsection of the thyroid cartilage at the level of the vocal cords. This was one of the cases treated by laryngotomy and the dense cicatrix following the filling of the wound over an intubation tube, which is a useless procedure. Note the separation and necrosis of the thyroid cartilage following the operation. The whole of the cavity of the larynx is filled with very dense cicatricial tissue, the central lumen being fringed with polypoid fungations. The right thyroid wing shows marked thinning as a result of perichondritis, and there are thin areas of endochondral bone formation stained very black on the lateral walls. The left wing is apparently intact, though the attached anterior segment is separating to form a "cartilage island." The arytenoid cartilages are metaplastic and bony, especially the left; while the right has been dislocated and cut in two sections. The muscles are distorted and out of place, and show myocitis. In the lower right-hand corner the inferior cornu of the thyroid cartilage is cut through in the section. (b) A high power magnification of the bony area of the thyroid cartilage. The top zone shows the area of perichondral infiltration. The next layer shows the rearrangement of the cartilaginous cells in a zone of calcified matrix and numerous trabeculae. The third and very black zone shows the layer of osteoblasts and the lower layer shows the zone of new bone formation with numerous lamellae and canals.

Fig. 16. A high power section through the thyroid cartilage. The child was thyrotomized for stenosis. There is marked distortion of the thyroid wings with a tendency to overlap at the site of the anterior incision. The entire lumen is lined with very dense new connective tissue fringed with polypoid masses. There is a septal formation of cicatricial tissue which practically divides the larynx. It arises from the dense connective tissue lining the left thyroid wing and is attached to the anterior cicatrix.

Fig. 17. Is a high power microphotograph of the dense masses of polypoid tissue taken by longitudinal section from the gross specimen, Fig. 8. These polypoid masses are arranged in tufts with the blood vessel as the stem. The dark areas are new connective tissue filled with blood vessels and very vascular. The pale whitish areas hanging like fingers are polypoid bunches and the very white line in the center of each is a blood vessel. This is, therefore, the reason why these masses bleed at the slightest touch. When of long duration they undergo partial myxomatous changes and frequently the tip of the tufts will be found to be similar pathologically to a mucous polyp.

Fig. 18. A histological section of a normal cricoid cartilage showing the thin cushion of mucosa and sub-mucosa and the reason why the

perichondrium of the lumen is easily attacked by severe necrotic diphtheritic infiltration. The inferior cornu of the thyroid cartilage is seen in the lower right-hand corner.

Fig. 19. Histopathological section taken from gross specimen, Fig. 5 (a), showing necrosis of the cricoid cartilage and how sloughs readily fall down into the lung, producing septic foreign body pneumonia. In the lower triangles between the inferior cornu of the thyroid cartilage and the cricoid the recurrent laryngeal nerves enter the larynx.

Fig. 20. This is a transsection taken from the gross specimen, Fig. 4 (a), which shows nature's method of regeneration of the cricoid two weeks after primary diphtheritic infection in a case of persistent auto-extubation. Note the complete absence of the cricoid ring with the exception of a small area of cartilage in the lower right-hand corner. The oval cartilaginous areas on the right and left are the inferior cornu of the thyroid cartilage and are normal. Note in the left-hand corner in the region of the inferior thyroid cornu the beginning calcification and osteoid tissue endeavoring to make a new cricoid bony ring.

Fig. 21. A later stage of nature's method of regeneration of the destroyed cricoid cartilage. An almost complete endochondral bony ring surrounds the lumen. The laryngeal lumen is lined with polypoid fringe. The recurrent laryngeal nerves, even in this instance, showed no signs of pressure.

Fig. 22. (a) A pathological transsection of the posterior hypertrophy or spur formation in a case wearing a tracheal canula for one year. The cartilages are not involved and there are practically no signs of tubal pressure ulcers. Villous polypoid projections surround the lumen. (b) A high power section of the same specimen which show from above downward: villous polypoid masses filled with small round cell proliferation and numerous blood vessels. The thickened mucosa and numerous mucous glands, and the normal perichondrium and cartilage.

Fig. 23. Schematic sketch to illustrate the relation of the intubation tube to the larynx and trachea, and also the reason why an oversize or angular head of the tube will cause supraglottic edema and inspiratory dyspnea. The head rests on the ventricular bands. Note the depth of the ventricular pouches. The narrow neck of the tube is opposite the vocal cords. The retention swell begins in the cricoid cartilage, and if the swell is too thick and oversize for the patient it will contribute in causing decubitus laryngeal "bed sores."

Fig. 24. (a) Schema illustrating the intubation speculum in place after the removal of an intubation tube, and the introduction of the tracheoscope for tracheoscopic cauterization of subglottic edema. (b) Illustrates the removal of the speculum and the cautery introduced and direct application made to the subglottic edematous tissue. Subglottic edema will close the laryngeal lumen within a few minutes after the removal of the tube. The introduction of the tracheoscope makes respiration easy while the cautery application is being made. The marker on the cautery carrier is to keep the cautery blade from going below the slant end of the tube.

Fig. 25. Intubational tubes. (a) Dilating. (b) Non-cough-up bulbous tracheal tubes. (c) Intubational laryngostomy tubes covered with soft rubber. (d) Cut-out flat head posticus tubes. (e) All soft rubber laryngostomy tubes and plug. The large size is the tube in the rough state after moulding. The small one is the tube cut down to suitable size and length. A small soldering iron is very useful in reducing the plug to the size wanted.

Fig. 26. (a) Shows a laryngostomy fistula beautifully covered with skin and the edges smooth and turned in, covering the entire larynx. An intubational tube covered with soft rubber is seen in the wound. (b) The same patient after the intubation tube was removed. The combination treatment with all soft rubber laryngostomy tubes and rubber covered intubation tubes completely cured this patient.

Fig. 27. Direct laryngeal views. 1. Shows the tumescent subglottic edema after the removal of the intubation tube. This edema will close the larynx in a few minutes and cause urgent dyspnea. 2. Shows the result after the first application of tracheoscopic cauterization, the subglottic edema is V-shaped after the galvano-knife is applied. 3. Shows the end result after two applications of the cautery. The child was reintubated with the bulbous tracheal tube after each cauterization.

Fig. 28. Shows two cases readmitted to the Willard Parker Hospital for recurrent stenosis after having remained without the tubes for six and ten years. Both of them were admitted during the severe winter and

both were suffering with subglottic stenosis. As both were in extremis, tracheotomy was performed on admission and the larynx examined three days later. 1. The case of six years of detubation shows a cicatricial web in the subglottic region. The vocal cords are perfectly normal as well as the voice. The opening in the web for respiration was not over one millimeter in diameter. 2. Shows the opening enlarged by antero-posterior galvano-knifing. It would have been a shame to perform intubation or laryngostomy with such a normal speaking voice. 3. Shows the condition of the subglottic region at the present time. There is still a small amount of lateral stenosis present, but the child is able to breathe perfectly day and night with the tracheal canula tightly corked. 4. Shows the stenotic larynx in the case ten years after detubation. Subglottic stenosis and edematous ventricular bands made both inspiration and expiration extremely difficult. Low tracheotomy was performed by Dr. Grover on admission of the patient to the hospital. 5. Shows how the larynx has opened after antero-posterior galvano-cauterization. The boy was now able to breathe fairly well by day with the tracheal canula corked, but became too neurotic and dyspneic at night and the cork had to be removed for easy respiration. 6. A direct view of the larynx after the third application of the cautery. The subglottic stenosis has subsided and there is sufficient room for respiration with the canula tightly corked day and night. The boy, a lad of sixteen years, was easily decanulated, and was breathing quite naturally at the time this paper was written, one and one-half years later. He has a good voice. This is the first time that we have had cases recur, after they had been detubated for such a long period.

Fig. 29. Shows a series of views of tracheoscopic cauterization from above downward, top row, and from below upward, bottom row. 1. The usual picture when the tracheoscope is passed to the subglottic region. 2. The tracheoscopic image after application of the cautery and gradual withdrawal of the tube to study further subglottic edema due to the reaction. The intubation tube is immediately introduced as the scope is removed. 3. A view in this persistent case requiring ten applications. Note the lateral edema with a fair size lumen for respiration. The tracheal rings can be seen below. 4. The end result and final detubation of the patient. Note that the subglottic region is free from stenosis and that the tube can be easily passed into the trachea below. 5. The entrance of the tracheal fistula. Note the polypoid granulations in the wound and the edematous edges of the slit in the trachea. 6. A view of a very difficult case of decanulation. The anterior and posterior edematous spur formations would immediately close the trachea when the canula was removed. Gentle tracheoscopic cauterization by retrograde methods completely cured the condition. 7. A persistent large spur edema in a tracheal canula case. Cauterization alone would not relieve the condition, but the case was finally cured after the writer's method of tracheal dilation. A rubber stopper was fitted into the tracheal fistula to prevent it closing by granulation tissue and also to keep it open as a safety valve should there be trouble with the tube. 8. The end result of case 7, after cure. (Note the small slit between the vocal cords as seen from below.)

Fig. 30. These three drawings show the end results of a few of the older children at the hospital which were viewed by the mirror. 1. A little girl who wore a tube for five years. Treated by dilatation, later tracheotomy for recurrent stenosis after one year of detubation. Redilatation after difficult decanulation. Final cure. Without tube for five and one-half years. The drawing shows ankylosis of the right arytenoid cartilage. The left is freely movable. Note the well formed vocal cords. There is a small area of thickening on the right ventricular band. The lumen is sufficiently free for good respiration; there is no dyspnea. The child has a very good voice. 2. A case who has been without the tube for six years. Has spells of dyspnea in bad weather according to follow-up nurse. Was readmitted to the hospital for observation. Slight subglottic infiltration seen by direct inspection. No necessity for tracheotomy. One application of cautery still without tube and breathing naturally. Child has a normal voice and good arytenoid motion. Wore tube for three years. 3. A case with small amount of motion of the arytenoids. Retained tube case for two years. Note the vocal cords that have formed even with only slight arytenoid mobility. Child has a good, though husky, voice. Has inspiratory crow at night when asleep. No stridor noticable during day. General condition good but kept under observation at the hospital. Has been detubated for four years.

Figure 1.

Figure 2a.

Figure 2b.

Figure 3.

Figure 4a.

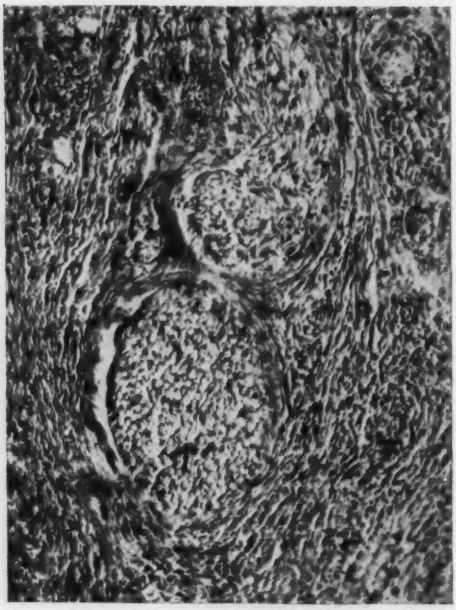


Figure 4b.

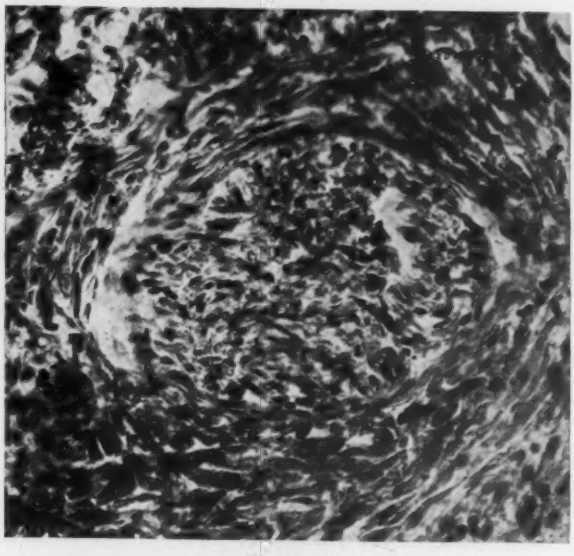


Figure 4c.

Figure 5a.

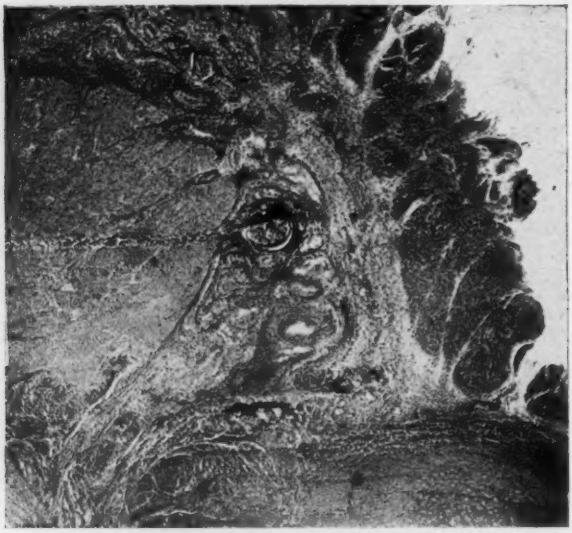


Figure 5b.

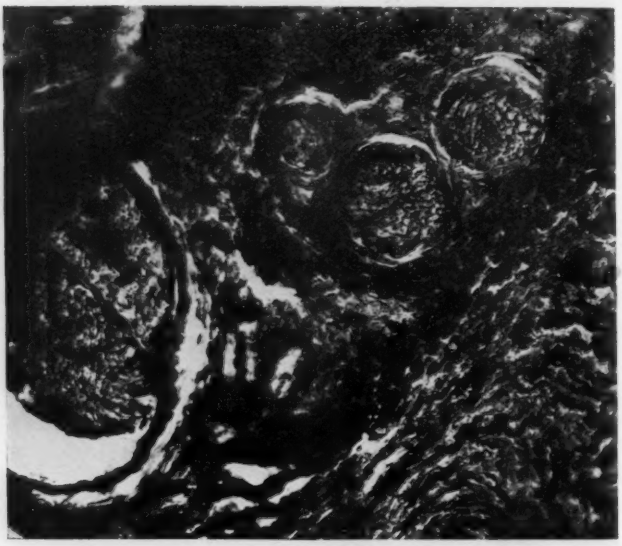


Figure 5c.

Figure 6.

Figure 7.

Figure 8.

Figure 9.

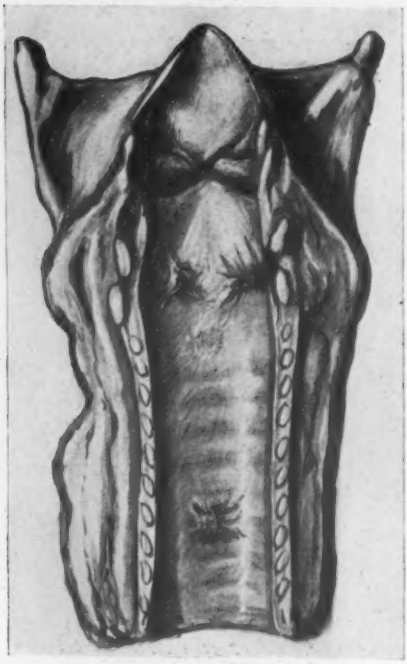


Figure 11.

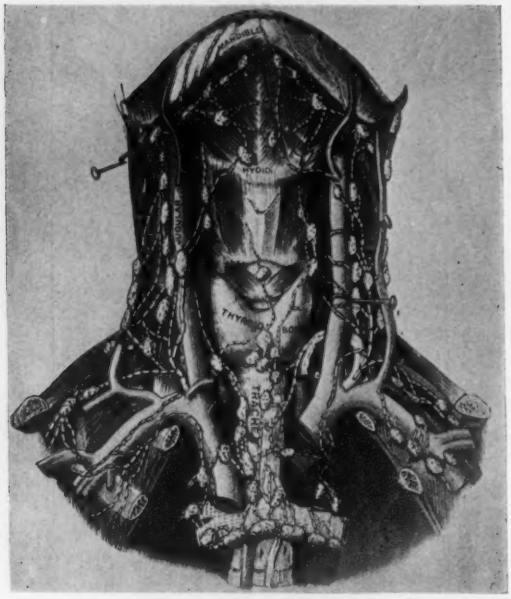


Figure 12.

Figure 13.

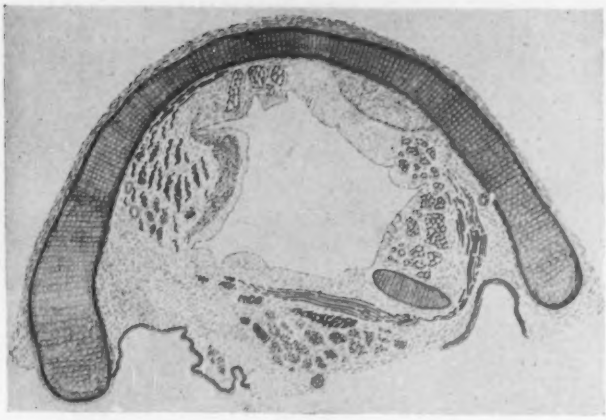


Figure 14.

Figure 15a.

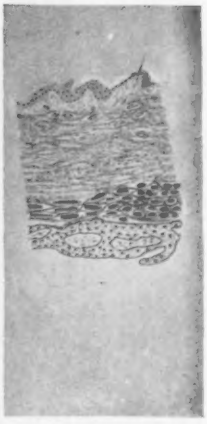


Figure 15b.

Figure 16.

Figure 17.

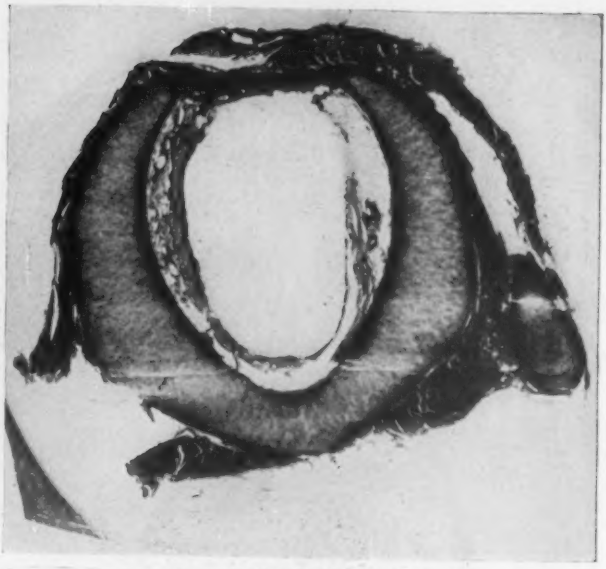


Figure 18.

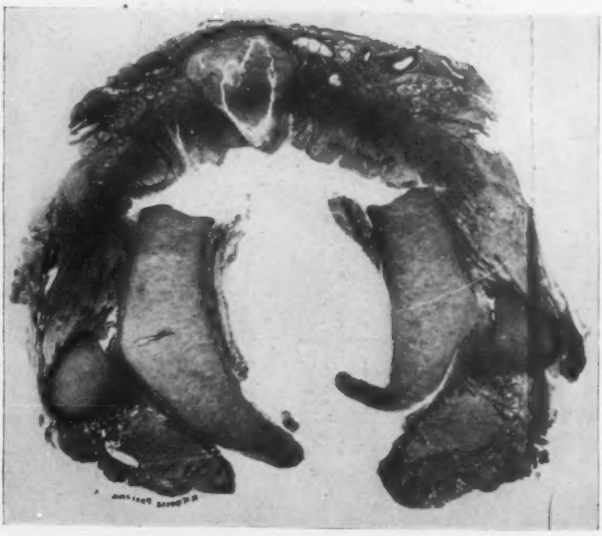


Figure 19.

Figure 20.

Figure 21.

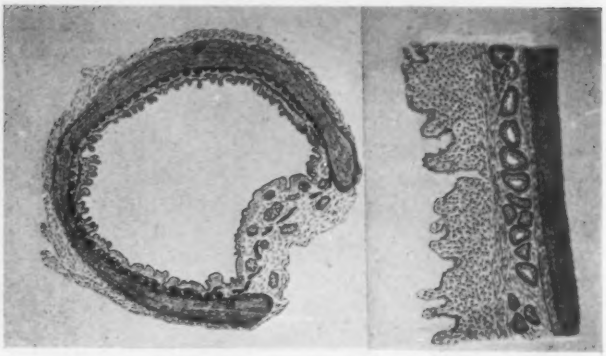


Figure 22a.

Figure 22b.

Figure 23.

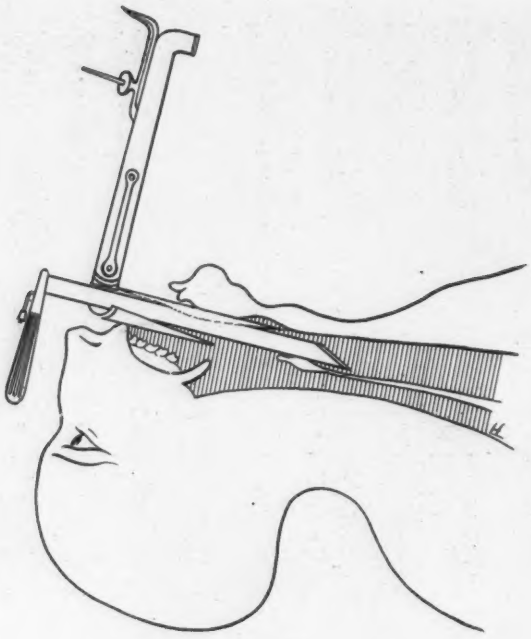


Figure 24a.

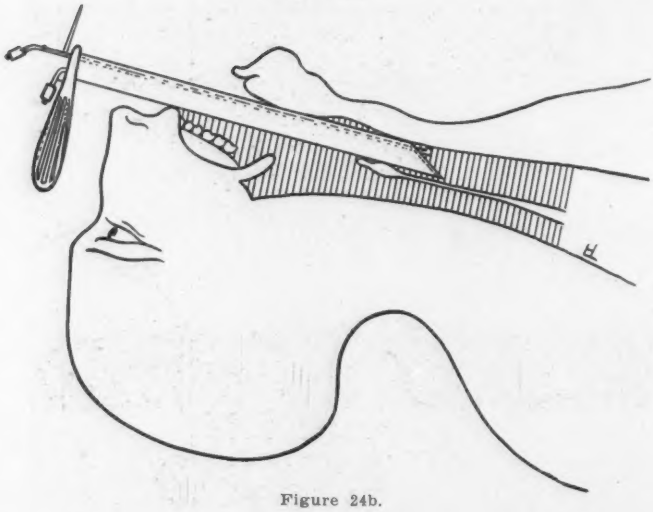


Figure 24b.

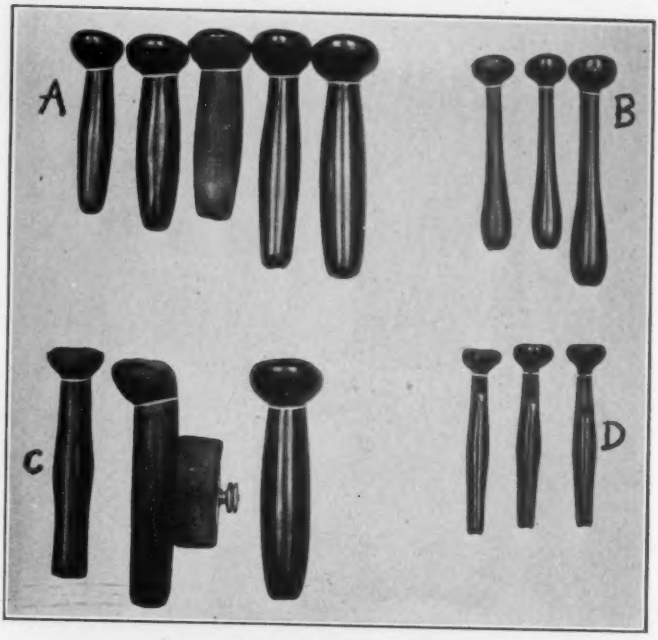


Figure 25, a, b, c, d.

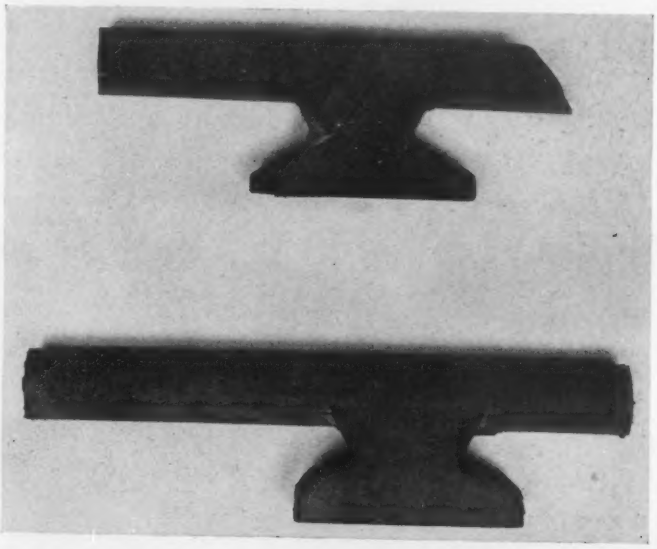


Figure 25e.

Figure 26a.

Figure 26b.

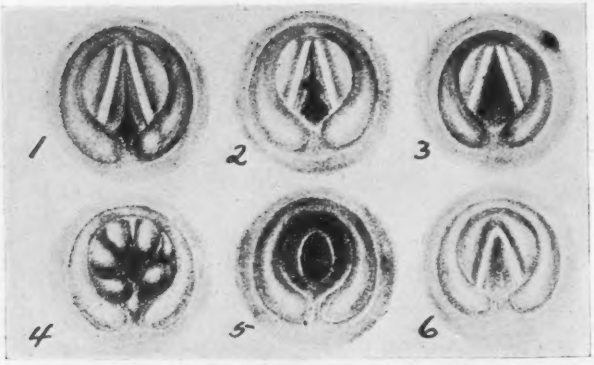


Figure 27.

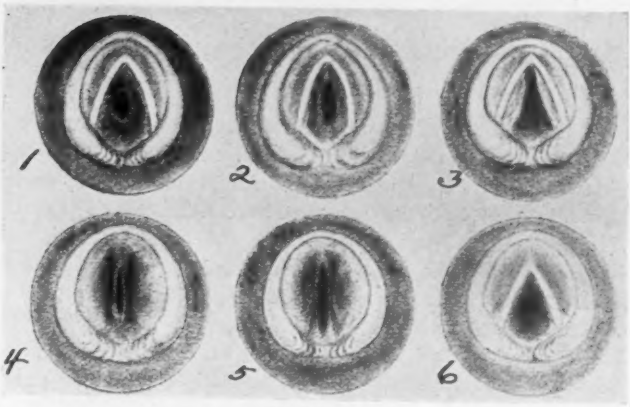


Figure 28.

Figure 29.

Figure 30.

THE TESTS FOR MALINGERING IN DEFECTIVE HEARING.*

DR. PHILIP D. KERRISON, New York.

As this subject is of present interest chiefly in connection with the examination of drafted men, it will be convenient to adopt the term used in the Government manual of directions to medical examiners and speak of the man to be examined as the "registrant."

It may be assumed that most of the tests for malingerers of deafness are known to the members of this society. My paper may, therefore, be limited to a discussion of their application rather than to a description of the tests.

Before taking up this discussion, which shall be brief, two points of some practical importance should be mentioned:

(1) In examining these cases in New York City, there has been some evidence that a certain number of malingerers have been previously coached as to the tests to be employed and the reactions which should be assumed. This, I believe, has been due in part to a practice, now abandoned by the advisory board of which I am a member, of examining several registrants simultaneously in the same room. The men so examined may easily discuss later their observations and deductions, and formulate their conclusions for the benefit of those coming up later for examination.

(2) It is quite important in dealing with suspected malingerers to give no slightest hint that they are in any way under suspicion. The more unsuspecting and credulous the examiner may appear, the more readily and conclusively will the examined respond to his tests. The most glaring evidences of deception should, therefore, pass without comment or apparent notice until the examination is completed.

Most malingerers of deafness who are subject to the military draft know that deafness of a certain grade in either ear will exempt them. Complete bilateral deafness is, therefore, for various and obvious reasons rarely, if ever claimed. Two types of unilateral deafness are assumed, i. e., (1) deafness advanced, but not complete; and (2) absolute deafness.

The tests upon the combined results of which I am usually able to base a definite conclusion are: (1) Weber's test; (2) the loud conversational voice test; (3) the binaural stethoscope test; (4)

*Read before the American Otological Society in Atlantic City on May 30, 1918.

tests eliciting incongruous variations in response; (5) the noise apparatus-reading test (Lombard's test).

My own routine method of examination is about as follows: Only one registrant at a time is admitted to the room. I learn from him which ear is the deaf, or deafer one, and whether he regards this deafness as partial or complete. If only one ear is complained of, I make a rapid test of the hearing of the better ear to determine that it is functionally sound or at least only slightly subnormal. This preliminary testing of the sound ear is essential to a proper interpretation of tests to be applied later.

Weber's test: I now apply a vibrating tuning fork of 256 double vibrations to the vertex of his skull, and if he refers the sound to his supposedly deaf ear, I am favorably impressed as to his probable honesty. If he refers it to his sound ear, I become skeptical, and proceed to the next test.

Loud voice test: The registrant's eyes are now blindfolded. Requesting him to close with a finger his better ear, which has already been determined to be approximately sound functionally, I repeat words and numbers to him at first in low voice and then in progressively louder and louder tones. If, when I have reached a pitch and intensity at which he should be able to hear and interpret the words with the sound ear even though tightly occluded, he still states that he can not hear it, I know at least that he is an intentional malingerer. This is a useful test which will expose many malingerers. An alert individual, however, may throw this procedure out of count by stating that he hears the sound through his occluded normal ear.

Stethoscope test: For this the ordinary clinical stethoscope with funnel-shaped chest piece is used. One ear piece is completely occluded with wax. Occlusion with cotton will not exclude the sound. Standing behind the registrant, the stethoscope is adjusted with the occluded ear-piece to his "deaf" ear. Words in a low whisper are spoken into the funnel-shaped chest piece, which naturally he should hear perfectly. The stethoscope is removed for the ostensible purpose of trying some other test, and then replaced, the occluded ear piece being this time placed in his sound ear. If he is able to hear now approximately as well as before, we have fairly sound evidence that his deafness is either assumed or grossly exaggerated. This is a fairly reliable test.

Tests eliciting contradictory responses: The registrant's eyes are now uncovered, the sound or better ear is closed with a finger, and the "deaf" ear is subjected rapidly to the commoner classical tests, e. g., hearing distances for watch, acoumeter, whisper or conversa-

tional voice; tuning fork tests to determine lower tone range, etc. His responses, so far as he admits hearing in any of these tests, are carefully noted. Following this, he is again blind-folded and the same tests are repeated many times, fairly rapidly and in varying order. If he is a malingerer and has not in the first instance claimed almost total deafness, his responses will almost surely demonstrate incongruous and condictory variations.

Lombard's test: This test, which requires a Barany noice apparatus, is one of the most dependable means of determining absolute or very advanced deafness confined to one ear. It depends upon the fact, that to the normal man the sound of his own voice is nceessary to the proper regulation of its tone and intensity. It is carried out as follows: The noise apparatus is adjusted in his sound ear and its machinery started in order to accustom him to its grating noise. He is given a book and told to read aloud in his natural voice and not to stop reading when the noise instrument is set in action. As soon as the noise begins, a man, whose opposite ear is profoundly deaf, will at once raise his voice, and if his deafness is absolute, he may literally shout. The malingerer, on the other hand, claiming a one-sided deafness which is not real, will continue to read in an even tone or in a tone only slightly elevated.

This is a test which a malingerer who has been coached may easily turn to his advantage. Otherwise it is one of the most useful at our disposal.

With a quiet room and sufficient time at his disposal, there are few malingerers who will be able to deceive a careful and experienced examiner. If the registrant claims absolute unilateral deafness and his reactions to the commoner test seem to justify this claim, he should raise his voice almost to a shout when a noise apparatus is operated in his sound ear. If he claims only partial but advanced deafness, his reactions to the various tests should be approximately constant. We are able, then, usually to detect the malingerer; but if the malingerer really suffers from some degree of impairment, it may be, and usually is, quite impossible to determine even approximately his grade of deafness. And so it may happen that a man partially deaf and to a degree which would exempt him from active military service, by attempting to deceive to the extent of pretending to a more advanced grade of deafness than is actually his, is stamped as a malingerer and sent to the trenches.

Bilateral deafness: Naturally, as there are many cases representing all grades of bilateral deafness, malingering may take the

form merely of an exaggeration of an existing defect. If such a person were persistently to assume absolute or very profound bilateral deafness, it is difficult to say what tests would expose the deception. The time-honored tricks of attempting to ensnare him by a sudden and startling question, the use of insulting or disparaging remarks, etc., are mentioned in many text-books. Such crude methods are usually uncalled for, however, for the reason that the risks to the malingerer of such flagrant lying are too great. The pretence of partial though disabling deafness, on the other hand, though less likely to be exposed through the testimony of acquaintances, is not so difficult to detect for the reason that the malingerer is burdened with the necessity of maintaining uniformity in his responses to the various tests. The surest means of exposure in such cases is the application of the classical tests, first to one ear and then to the other, and then, after blind-folding him, repeating the same tests and comparing the two sets of responses. In my opinion, the most useful single test is the exact determination by tuning forks of what he claims to be the lower tone limit of each ear. For this purpose, the Hartman set is wholly inadequate and useless. The average man may easily remember the difference between tones an octave apart, but few men other than trained musicians could be expected to remember the exact tone of a fork previously heard. In my private work I have for many years used a set of 29 forks which without clamps represent every full note of the musical scale from 32 to 512 double vibrations. A recent actual experience will illustrate the value of tuning forks in exposing a malingerer. On April 30th last, a young man of 26 years came to my office complaining of greatly impaired hearing. My routine functional tests showed among other things that his lower tone limit in the right ear was 240 double vibrations (h). On completing my examination, I found that he was interested, not so much in the question of prognosis or treatment as in what he called his "chances of getting into the army." This seemed a reasonable subject of inquiry on his part. Without any suspicion of him in my mind, I concluded to run over my tests, when I found to my surprise that his lower tone limit was now 170 double vibrations. I now learned that he was subject to the draft. There is little doubt he was contemplating this form of malingering, and was utilizing my office as a convenient source of information and me as a convenient instrument to practice upon. The point I wish to make, however, is that the tuning forks exposed an intentional malingerer in a man whom I did not in the least suspect.

58 West 56th Street.

THE PROBLEM OF STAMMERING AND ITS SOLUTION.*

DR. ELMER L. KENYON, Chicago.

The honored and venerable Dr. Alexander Graham Bell recently spoke with much feeling of the struggles and discouragements of the men and women who in his early pioneer days fought to establish on a scientific basis the principle of teaching the deaf mute to talk, and to "hear with the eye." Developed from those early struggles one now witnesses a large and still growing nation-wide system of special schools and special classes, for teaching the deaf mute to talk and of the deaf generally to read the lips. In the days to come the medical profession will, I venture to prophesy, look back with a feeling of strangeness at the ignorance of a past which caused it to leave persons afflicted with serious disorders of speech to the exclusive treatment of laymen, and will look with considerable satisfaction upon those pioneers in their profession who struggled to place the subject on a scientific foundation. The effort that sets out to solve the terrible predicament of more than one hundred and fifty thousand stammerers in the United States alone is not unworthy of study, especially since a national movement is already under way. Clear realization of aims and purposes is necessary for the right guidance of this movement. And every community must eventually become involved.

THE PROBLEM.

First, then, let us try to understand what the problem of stammering is. Suppose that we were in imagination to set apart for intelligent observation the stammerers in a community of one hundred thousand persons. Such a group would number from four hundred to one thousand stammerers. All walks of life would be represented; also all ages, from the beginnings of speech, to the relatively thinned out ranks of the later years of life; male persons would exceed female in the proportion of about seven to one.

The obvious and distinguishing fact about stammerers is their haltings and hesitations and stumblings in speech. These may consist only of light repetitions of the first sound of the word, perhaps scarcely observable but yet very embarrassing to the stammerer himself. But the manifestations often mount up to holding in some

*Presented by invitation to the State Medical Society of South Dakota, at Mitchell, S. D., May 23, 1918.

part of the speech region even to the intensity of firm tonic spasm, so severe and prolonged as to render actual talking impossible. The very worst may be compelled to carry a writing tablet in order to make themselves understood.

While this outward difficulty with the speech is the obvious fact about stammerers, the deeper fact, just as characteristic and distinguishing, is an inward emotional disturbance. This combination of emotional perturbation with physical spasmodic abnormality of speech characterizes the disorder. The one does not often, in my judgment, occur without the other.* Stammerer, or stammering can be understood only as one explores this emotional phenomenon. It varies much in intensity at different times and in different individuals. It is always associated with a feeling of embarrassment in respect to the stammerers speaking relationship to those in the immediate social group.

The question as to whether the emotional disturbance is casual of the peripheral spasmodic phenomena, or whether the emotion is merely the embarrassment resulting from the peripheral disturbance, has been much discussed. The author believes that both facts are true; the stammering finds its inciting cause in the social emotion present, and the social emotion is also much augmented by the embarrassment resulting from the peripheral phenomena. The causal explanation of stammering, in the author's judgment, lies in a disturbance of the nervous control apparatus of the peripheral mechanism of speech, incited by social emotion; the remarkable complexity of muscular action required for speech probably has an important bearing on the incitation of the disorder. A more detailed statement of this theory cannot here be presented: but it may be remarked that any true explanation of the nature of stammering must consider closely the point of contact between the psycho-neurological processes of speech and the complexity of the muscular phenomena required for speech. In this connection it will be well to recall that no constant or characteristic anatomical imperfection of either the cerebral, or nervous, or peripheral organs related to speech is known to be present.

Nothing is more characteristic of stammering than its irregularity of manifestation. When entirely alone the tendency to stammer is ordinarily in complete abeyance; but let a second person break in on this seclusion and the stammering returns. Circumstances which

*But in advanced years and also on certain occasions in younger stammerers, a definable emotion may be absent. In such cases a habit of years is dominating the situation.

tend to increase emotion excites or increases the stammering. A young drafted soldier, who ordinarily stammered very little, found himself while on sentinel duty at the training camp, completely unable to utter the single word of command, "Halt!" The emotion resulting from the sense of responsibility completely upset for the moment the normal physiological processes of speech.

In origin, in spite of well known exceptions, stammering is characteristically a developmental disorder. Probably more than ninety per cent of the cases originate between the second and sixth year of life. At this period neither the mental processes, the emotional processes, nor the muscular processes relating to speech, have attained to fixedness of function; every thought and act is the creature of undeliberate and unanalyzed impulse; the physical processes of speech are step by step feeling out their experimental paths that lead to final trueness of action. The exceptions to this developmental origin are the relatively occasional case which arises later in the usually young life, more than probably from severe fright. The cases of imitation are also developmental.

Our imagined group of stammerers finds itself seriously misunderstood by normally speaking persons. They find themselves to a serious degree looked upon as human oddities, and legitimate subjects for joking. Two facts are often misunderstood: the personality of stammerers, and the seriousness of their affliction. Behind the stammering is the stammerer. Because of the oddity of his speech people often reason that the personality of the stammerer must be freakish. But on the contrary, excepting for the effect on character resulting from the stammering, the stammerer does not differ from other people. His worst fundamental peculiarity is a certain excitableness, or emotionalism, or both, but not more than is seen in non-stammerers in many times greater numbers. His intellectual capability tends to stand above the average. Because of his sufferings, he is apt to be especially sympathetic and likeable.

Behind each instance of stammering is the stammerer, a human being possessing sensibilities and aspirations and life necessities. When one has over and over witnessed the great dread of stammering children and young men and women and adults to come into association with their fellows, when one has seen young men and women shrink away from completing their high school and college education, or has witnessed them frequently in tears because people smile, or has seen rugged men sob at the thought of

their sufferings and failures, when one has seen young men drift into sad, secluded, protected and unaggressive lives, when one has witnessed careers ordinarily promising to their owners fizzle out into dismal failures, when, in short, one has realized how the life of a stammerer is so much more full of suffering and struggle than that of non-stammerers, he feels no disposition to laugh at these sufferers. It is the duty and privilege of the medical profession to understand them and become their protectors. No one who understands takes their affliction lightly, or doubts the seriousness of their problem.

THE PRESENT SITUATION.

Under present conditions, what really becomes of the army of from four hundred to one thousand stammerers, who represent the ordinary burden of each community of one hundred thousand persons? When they turn to the medical profession, where they have a real right to expect assistance, they are met with little else than ignorance of their problem. The present-day advice of the medical profession to the stammerer is, speaking of the profession as a whole, a great deal more harmful than no advice at all. The panacea of the family physician these days when approached by parents for advice concerning their stammering children, seems to be, "Oh, let him alone; don't worry; he will eventually grow out of it." A few do grow out of it; but nearly all, evidently not appreciating this sage advice, grow deeper into it.

Relatively few stammerers reach the conscientious, intelligent treatment which is offered very sparingly in different parts of the country. But most of those who receive treatment drift easily and naturally into the widely opened arms of the flamboyantly advertising commercial pretenders, who know only crudely concerning the nature of the disorder, or of its proper treatment, even if their efforts were sincere. Gutzmann, whose right to speak on stammering is unquestioned, says: "In no field, with possibly the sexual field excepted, does swindle and quackery bloom as in the field of stammering."*

Most stammerers struggle along as best they can without treatment, and suffer the long drawn out consequences. With the experience and maturity of the advancing years the tendency to

*Within a year the names of prominent physicians have appeared in a large daily newspaper advertisement as references for a stammering "school" whose methods are so superficial and confused as to be almost negligible, so antiquated as to savor of a long past generation, and so morally questionable in business methods as to at once arouse the suspicions of any thoughtful person.

stammer grows less and less, until towards middle life, or later, it has with painful slowness perhaps practically disappeared. A conspicuous failing in the present situation is the utter disregard of prophylaxis, for the great hope of any adequate mastery over the problem lies in stemming the development of the disorder before it has become deeply rooted in the individual consciousness and personality.

LOCATING THE PROBLEM.

But whose problem is it? We may say it is the problem of those who can and will solve it. But who can solve it? In this country the problem has been approached almost solely by laymen. If the flamboyant advertisements of commercial "schools" for stammering were true or even half true, inroads would have been made on the problem generations ago. As a matter of course, however, one should not look to the solution of complex and difficult scientific problems by half educated and unscrupulous business promoters. But the problem has been approached also by laymen who are not unscrupulous and in non-medical directions are educated. The teacher of elocution, or of voice training, the teacher of the deaf mute, and the trained psychologist, are examples of the sincere laymen who have approached the problem.*

But if sincerity were alone needed to solve complex human problems their solution would be easily at hand. Such solution depends not alone on general intelligence, but depends rather on intelligence coupled with education deep enough and varied enough to cover the elemental knowledge factors in volved in the problem. The desideratum with any such lay effort lies in the narrowness of educational approach to the problem. For example, the etiological basal factors are beyond the reach of such lay workers. So each half educated individual approaches the problem in a halfway manner. The pure psychologist perhaps ignores the peripheral physical aspects of the problem; the teacher of the deaf mute may have little or no conception of the psychology, or of voice training; and the voice trainer is perhaps ignorant of the psychology, with also an inadequate understanding of the peripheral physiology of speech. And none have a thorough understanding of the etiological and pathological possibilities on either the psychic or physical sides. It is not to be wondered at that little fundamental progress in the solution of the problem has been made by laymen. It

*That all of these have not been sincere, or, if sincere, have not been ordinarily intelligent, is indicated by the efforts of at least one of them at the present time to undertake treatment by correspondence.

often happens that laymen get an inkling into the light which has been thrown on the treatment of stammering, but that having little insight into the fundamental reason for the measures learned, apply them so carelessly, or mechanically, or so unintelligently as to largely offset their value. It happens, also, on the other hand, that some laymen have had excellent and careful training and have grasped the treatment problem with excellent intelligence.

But in respect to narrowness of education the lay workers for stammerers are by no means alone. For the same fault must also be laid at the door of the medical profession. If the neurologist slurs the laryngological field, both as to physiology and pathology, and if the laryngologist slurs the psycho-neurological field, and if both slur the great field of voice and of speech training, they are on much the same narrow plane of partial competence as the layman. No effort has fallen more flat, for example, than the pure psycho-neurological treatment of stammering. Moreover, at the present time no adequate facilities exist for the especial education of physicians or laymen in this field, while the undergraduate medical schools, with two or three exceptions, ignore the subject altogether.

THE SOLUTION.

In approaching the solution of the problem the first great consideration, as with all complex medical problems, is to keep clearly and prominently in mind the etiological factors. Not only must the study of etiology be continued by those whose education permit of full grasp of the backgrounds of knowledge, but methods of treatment must be ever based on etiological conceptions, as they develop. Moreover, all complex projects require for their execution directing minds, capable through training and breadth of knowledge, of looking far into the backgrounds and of correlating and unifying to a common purpose and plan all the various knowledge factors involved.

The field is, to be sure, frankly a border line field, and non-medical persons are destined to play a very large part in whatever is done. But the fundamental need is for physicians whose education is broad and complete for the task to be accomplished. Moreover, the call is for physicians who are disposed frankly to enter into the work itself, not merely to sit on high and direct lay assistants. For, unless the fully trained expert physician himself works in the field he is not fitted either for directing the work

adequately, or, especially, for taking up and carrying along the work of etiological and other investigation. Especially is a solution not to be found in the direction of lay workers by physicians uneducated and untrained, or half-educated and half-trained, in this field. Such a plan serves only to bungle the real solution. Why a physician should be able to solve, through lay workers, a problem which he does not understand himself is hard to realize. If the work of rightly educating and training the stammerer into normal self-control is not worthy the best efforts of thoroughly trained physicians then the treatment of neurasthenia may also well be left to laymen, or the treatment of insanity left to the pure psychologist.

Combining stammering with the other disorders of speech, each large community of population should be provided with a fully educated speech specialist. He need not confine himself to this field alone, but may well attach it to the field of laryngology and otology, or to that of neurology. His fellow practitioners should be broad enough to stand firmly behind his pioneer efforts. Here certain women physicians, as well as men, may find an especially suitable field for their life work.

But what is to be the part played by the lay workers? This depends much upon whether physicians respond in sufficient numbers to the opportunity which is theirs by right of education. The field is necessarily medical; the full domination of the field is possible only to physicians. But the field is very largely pedaegogic, and to that extent the educated and trained lay worker is bound to have a large part in it. The local directorship may fall into intelligent lay hands, who may depend for aid on the medical profession in the community at large, but the trained physician specialist will always have the deeper and firmer hold. But lay workers will always have a large part in the pedaegogical side of speech work in general.

If such a plan as is here contemplated is to be carried out, adequate provision for the education, both of physicians and of laymen, must be developed. Such provision does not now exist in completeness. A center for such special education should be developed in connection with one or more great educational institutions. The scope of this educational plan would include all defects of speech; it would offer instruction in special psychology, neurology, anatomy, physiology and pathology, in the didactic and clinical study of each speech disorder, study of the feeble-minded,

training in speech development, in voice development, and in hygiene applied to this especial field.

LINES OF ATTACK.

The solution of the problem of stammering, as of other defects of speech, lies, then, fundamentally, in the development of a sufficient number of medical specialists who have been adequately educated in the peculiar directions required for a complete understanding of this problem. Anything short of such a plan is destined to delay and bungle the solution. Such a company of specialists, although very small in numbers, is already in existence in the United States. As the number increases and the work broadens, what shall be the lines of attack on the problem?

First of all, these speech specialists should be formed into a national association, with provision for at least attendance and cooperation by lay workers as well. All phases of the subject may here be discussed and thus the knowledge of the subject be brought to the point of standardization reached by other medical subjects.

The work will tend to divide itself into certain defined efforts: 1. Prophylaxis. 2. Private treatment. 3. Efforts applied in the public schools.

Prophylaxis offers a most important opportunity, an opportunity which has heretofore been almost wholly overlooked. It will involve certain lines of effort: 1. Education of all physicians in the under-graduate medical schools with respect to the general phases of the problem. 2. Education of mothers. 3. Earliest possible treatment.

The general intelligence of an intelligent medical profession will become infiltrated into the public mind. Physicians will educate mothers directly as to the importance of preventative treatment, before a fixed habitual development into the life and speech has been accomplished. The general physician may himself undertake such prophylactic treatment in many cases. The earliest possible expert private treatment will then become more common. Efforts in the schools will be made with much the same idea of prophylaxis.

Each large public school system will eventually come to have the speech problems of its children under the competent oversight of trained medical speech specialists, or, at any rate, under the oversight of lay specialists adequately trained in medical centers. The aim of the school work will be to take the stammerer at the earliest possible moment and effectually arrest at that period the progress of the disorder. In some of our cities the public schools have al-

ready taken up the problem with reference to their stammering children. It is not my purpose to attempt to analyze how well or how badly the problem is being managed in the schools generally, but rather to point out a danger in this direction. Recently the author was approached for a recommendation by an individual who was seeking to become the director of speech work in the public schools in one of our medium sized cities; and yet the knowledge of this individual concerning both the nature and treatment of stammering was worse than puerile, and the individual seemed to have little desire or aptitude for improving his knowledge. The author cannot say, but from what transpired, is led to suspect, that the goal of a position as school director for abnormal speech was attained by this thoroughly unqualified individual. If the schools are to take up the problem under the direction of incompetent directors the solution is to be still further put off and jeopardized.

PRINCIPLES OF TREATMENT.

At the present time the conceptions with respect to treatment are far from uniform, even among competent students, and yet a tendency towards uniformity is developing. When it is realized that a considerable number of individuals succeed in ridding themselves of their own stammering without treatment, through patient efforts at self-control, it will be understood that even the most ill advised efforts at treatment are bound to succeed in a certain number. It is partly by shrewd business methods and partly by reason of this great variability in the seriousness of the disorder, and in the personality of stammerers, that charlatans are able to continue in business. But, generally speaking, stammering eventually comes to be deeply rooted in the very mental and emotional nature of the individual, and is correspondingly hard to eradicate. So long as present differences in the conception of etiology exist, one cannot look for uniformity in methods of treatment. One worker emphasizes the psychological aspect of treatment, another voice training, etc.

The basis of all treatment rests on the principle of educated self-control. Two main concrete avenues of application of this principle are available; one has reference to an educated, conscious application of physiologic control of the peripheral speech mechanism, and the other to subduing more or less directly the nervous and emotional disturbances upon which the stammering depends. The younger the child the less in general is the need, or the possibility, for the employment of complexity of method; for the deeper physical disturbances are ordinarily matters of development during years of cumulative psychical and physical disturbance.

Certain serious misconceptions with reference to treatment may be attributed to the unfortunate prominence of the unscrupulous advertiser. His "game" usually is to "guarantee" cure within a certain short period, or resulting from a short period, of treatment. Thus the idea of a six weeks' period for treatment and cure has come to permeate the lay mind. Stammering is practically never cured in a period of six weeks, unless in very young children. Probably as much as ninety per cent of the stammerers treated by the superficial and careless methods of advertising charlatans are not cured, either in six weeks or six years. The crux of the matter is this: while a period of six weeks is usually sufficient to establish a strong basis of control, the stammerer may need the patient, intelligent, sympathetic oversight of one whom he realizes has a clear insight into his psychical difficulties, lasting until the tendency to stammer has passed away. This treatment is closely allied to the oversight required over the life of the neurasthenic and has much the same reasons. Its duration varies from three months to one or two, or rarely, three, or even more, years. With such a skilled watchful oversight by one possessing the knowledge and personality, permanent cure is possible in almost all cases. In lieu of such expert oversight, the mother or other intelligent adult is often a very practical substitute. It should be stated that without serious and persistent co-operation by the stammerer himself, complete success in treatment is out of the question. One great difficulty is the education of parents or adult stammerers to appreciate the necessary conditions of success.

Another misconception with respect to the treatment of stammering has also grown out of the influence of the advertiser; namely, the idea that stammering is best treated in especial "schools" for stammerers. This idea carries with it ordinarily, treatment in classes, according to a routine. In some large stammering "schools" practically no other method excepting class treatment is employed. And yet the nature of the disorder is such that, in order to develop the strong character-building control necessary, a strictly personal relationship between physician and patient is almost always necessary. Classes may best be employed only in a limited portion of the work. But the objection to stammering "schools" is more fundamental than the class system objection. In view of the fact that the abnormal phenomena occur only when circumstances have aroused the social emotion on which it depends, inculcation of the control which leads to cure must go on under the conditions of

life necessarily to be lived by the individual. The stammerer may talk without any tendency whatever to stammer in the "stammering school" and yet be practically without control at all in the environment of his ordinary life. Thus it is that the stammerers treated in "stammering schools" practically always have great difficulty in exercising control on returning to the home environment. "Schools" may be utilized for inculcating a knowledge of how to be controlled, but the development of self-control itself cannot be a school matter. The assertion of Alexander Graham Bell that a principle of education was violated whenever deaf mutes were educated outside the environment of normally speaking persons, applies just as certainly to stammerers. The idea that stammering is recoverable excepting through disciplinary self-control under the ordinary conditions of life is a false therapeutic principle. The best manner of approach to the problem is through individual periodic consultations, or consultations in groups of two or three, while the stammerer continues to master the disorder in his home, or similar environment.

Two practical questions remain to be discussed. How may the public judge of the worth of individuals, or institutions, and so avoid deliberate deception? By inquiring into the scientific professional and moral standing of the individual or institution, rather than to take the advertised word of the business promoter. It should be understood that a certain kind of testimonial is as easily obtained by the business agents of "stammering schools" as for patent medicines; also, "guaranteeing" the cure of stammering is almost as uncertain a business as guaranteeing a cure for pneumonia; the uncertain and uncontrollable elements in the problem are, all the circumstances considered, about as serious in the one case as in the other. How can the patience and perseverance and intelligence and courage of persons one does not know well be guaranteed? How can one know the difficulties of emotional control until he has thoroughly studied his patient. May one "guarantee" cure in advance without consideration of the persistent tactfulness and insight required by the physician in the individual case, and especially without providing at all for such individual necessity? Let the stammerer beware also of the business promoter who, contrary to business principles, demands a lump sum in advance for a service the stammerer is necessarily unable to judge the worth or value of. And, finally, beware of secrecy as to methods of treatment.

In view of the fact that the physician who treats defects of speech is obliged to compete directly with laymen, a new situation with respect to the ethical principle of advertising is brought up. The layman who treats stammering, or the lay institution, or even the medical institution that treats stammering, is considered ethically correct in advertising. Whether the organized medical profession should not officially recognize this new situation, and officially sanction the broader use of a professional card in print for this field of service, than is now considered good medical ethics in ordinary practice, is an important question. In no other way can a situation of equity between institutions, medical or lay, for defects of speech, and the individual physician be brought about. It is a serious blunder to allow inapplicable precedent to block scientific and professional progress.

The final thought that I shall express is this: that as the organized American medical profession has attempted to bring out into the sunlight of observation the deceptive sides of the proprietary medicine business, so there is offered a similar opportunity to throw the light of professional scrutiny upon the deceptive side of institutions and individuals who treat stammering. And such a movement should take a similar form to that adopted against the patent medicine advertiser. It should establish certain principles and standards, which if lived up to, would establish the honesty of purpose of the investigated institution or individual. Institutions and individuals could then be published in approved and unapproved lists. Both the benefit to the public and the encouragement of sincere scientific effort in this field would make such a professional movement well worth while.

SUMMARY AND CONCLUSIONS.

1. Stammering is a serious disorder ,distinguished by emotional disturbance accompanied by a distressing spasmodic abnormality of action of the peripheral organs of speech. The numerous sufferers are much in need of adequate treatment in every part of the country.

2. Under present conditions sincere and intelligent oportunities for treatment are utterly inadequate. Most stammerers remain without treatment, or are treated by charlatans.

3. Lay efforts at solving the problem, broadly speaking, cannot be depended upon to solve the problem, because of the narrowness of their knowledge. Medical efforts sometimes also fail for the same reason.

4. The problem can be completely solved only through the work of physicians especially educated and trained for the work. Medical specialists and well educated laymen must work in harmony. Adequate provision for the education of both physicians and laymen must be provided at large medical centers.

5. The solution will tend to take the directions of the development of a system of prophylaxis, appropriate treatment and of efforts applied in the public school.

6. Treatment rests on the principle of educated self-control; concrete application of this principle is directed, first, towards conscious control of the peripheral speech mechanism, and, second, towards direct control of the emotional and nervous disturbance.

7. The period of treatment should not be arbitrarily limited; it varies greatly with the individual and, in difficult cases must, if successful, extend through months and, rarely, many months. Success is never easy, but under rightly controlled conditions is possible in most cases. The idea of stammering being "cured" in "stammering schools" violates a fundamental therapeutic principle; self-control must be attained under the ordinary conditions of life.

8. When the physician adopts a professional activity which is also legitimately the work of laymen, it may be wise to officially modify the exact application of the principles of medical ethics to apply especially to these physicians.

9. The deliberately deceptive "stammering schools" should be published to the world, as have been the dishonorable patent medicines, through the organized medical profession.

104 S. Michigan Avenue.

Tonsillectomy in Arthritis. E. L. WARREN, *Minnesota Medicine*, April, 1918.

Given a case showing chronic or subacute "rheumatism" there seems no question that a tonsillectomy is indicated, other sources of infection having been eliminated, if we feel certain that the tonsils are constantly adding to the blood stream toxins which cause and keep up the symptoms. Aside from very favorable effects upon the joint symptoms a pre-existing endocarditis is frequently seen to be decidedly improved. ED

REPORT OF SOME CASES, MOSTLY TRAUMATIC, OF SERIOUS DAMAGE TO THE NOSE AND ACCESSORY SINUSES, OPEAATED UPON EXTERNALLY WITH EXCELLENT COSMETIC RESULTS.*

DR. JOHN R. WINSLOW, Baltimore, Md.

The following cases, of interest in themselves, seem to be especially in line with war-time practice, and are on this account put upon record.

It is regrettable that for several reasons it is impracticable to present these cases in person rather than by photograph.

Accept my assurance, however, that they have not been "camouflaged," and rather under-represent the results than otherwise.

A Case of Extensive Traumatism of the Nose, Face and Frontal Sinuses due to a Fall from a Height. Operative Cure with Exceptional Cosmetic Result: Mrs. H. A. C., age 35, was seen by me about 2 p. m., Sunday, April 16, 1916, at St. Agnes Hospital, in consultation with Dr. H. J. Hahn. Her statement was that she was awakened suddenly about 2 a. m. the same morning and intending to go into an adjacent room, which is at the head of a staircase running from the first to the second floor, for some medicine, she stepped, as she thought, into the room but really into space; the first thing that she knew afterwards was that she lay swooning in a puddle of blood; she thinks that she was unconscious only a few moments.

She must have struck upon her nose, chin and right side of the face, judging by the injuries received; there was an oblique cut across the bridge of the nose from the inner end of the right eyebrow to the termination of the bony nose, also a cut from a little to the right of the middle of the upper lip to the angle of the mouth, making a triangular flap; similarly a cut from about the middle of the lower lip running outward and nearly meeting the previous one; the lower lip was torn from the jaw bone, and five lower teeth were knocked out. There was also a long cut (2 in.) to the bone, on the left side above the frontal eminence at about the hair line.

Her appearance was described to me as being a horrible sight. Dr. Hahn was summoned in the emergency and conveyed the

*Read before the American Laryngological Association, May, 1918.

patient to St. Agnes Hospital where the cuts in the face were sewed up with inner and outer sutures, and temporary dressings applied to the nose. A number of radiographic plates were also taken, which showed fractures of both nasal bones and nasal processes, left outer orbital wall, and an oblique fracture across the anterior wall of both frontal sinuses.

It was nearly twelve hours after the accident before I saw the patient (about 2 p. m.) at the hospital, and preparation for operation had been made.

After etherization, examination revealed a fracture of both nasal bones, the left one being dislocated and lying loose in the tissues, the right comminuted into small splinters.

The bony nasal septum was fractured from its upper articulation and partly destroyed, so that a periosteal elevator could be inserted through the external wound into the nose and out through either external naris.

The nasal septum was also fractured and dislocated at the vomeral articulation forming a large ascending ridge obstructing the left nostril. The floor of the right frontal sinus was fractured and missing, so that the little finger could be inserted through the external wound and up into the sinus.

There was distinct crepitus of the right malar bone, but no depression. The wound and the nostrils were cleansed with extreme care. The nasal bones were replaced and sutured with catgut, even small splinters being sutured by their periosteum to the adjacent tissues. In view of possible contingencies, however, the septal ridge was not removed but was left as a resource for plastic work. Nor was any special treatment of the malar and orbital fractures deemed necessary.

A drain was inserted into the frontal sinus, and a separate strip of iodoform gauze into each nostril.

The skin wound was closed with fine silk sutures, except a small opening which was left temporarily at the inner angle of the right eyebrow for the sinus drain; this was covered with a gauze pad, but the rest of the wound was sealed with collodian and silver foil.

No external support was applied to the nose, as it was not considered necessary, in view of the ease with which fragments of the nasal bones usually remain in position, nor safe in view of the doubtful extent of the cranial injury.

Considering the extensive injuries and the possibility of an undetectable fracture of the base of the skull, an extremely guarded prognosis was given the husband, both as to disfiguration

and as to life. Fortunately, this was not warranted by subsequent experience; the following day the temperature was 103° and while slightly dazed the patient presented no evidence of cerebral complications, nor did any subsequently develop.

Usual after treatment was carried out by Dr. Hahn, Dr. Stewart or myself.

On April 24 (8 days) the stitches and dressings were removed.

Primary union was obtained except a small sinus at the lower end of the incision; this caused some apprehension but promptly healed; the sinus left above had been previously sewed up, at this time the bridge of the nose was firm.

On April 28 the patient was able to leave the hospital.

All wounds had healed, but she was suffering from general prostration and a marked paralysis of the right side of her mouth and face.

Dr. Hahn assumed charge of the case and I did not see her again for about a year, May 1, 1917.

The patient having regained her health and vitality and danger of collapse of herself or her nose having passed, it was deemed desirable to remove the thick septal ridge, badly obstructing the left nostril. This was done at this date with Hajek's chisel and a mallet, and ultimately resulted in decided increase in breathing capacity.

Present condition, May, 1918—General health and spirits fine.

The bridge of the nose is firm and but slightly flattened at the root; there is a scar about 1/16 inch wide which is readily concealed with a little powder.

The scars of the chin and lips are scarcely noticeable, the one of the scalp is covered by the hair and very slight.

The movements of the upper lip and mouth are practically normal.

In general, the disfigurement is wonderfully slight. (Photographs.)

Two features in the treatment of this case seem deserving of emphasis:

1. The early dispensing with dressings for the facial wounds, none having been employed after the first few days.

2. The preservation and re-implantation of bone fragments, even loose splinters.

The fact that the small bones of the face have unusual vitality has been known clinically for years, and was impressed upon me as an interne at the University Hospital by the late L. McLane Tiffany, Professor of Surgery.

Comparatively recently this fact has been given a scientific explanation, and in a much wider applicability, by animal experimentation.

Very recently, a report of a series of experiments upon bone transplantation and implantation has been made by Callie and Robertson (*Jour. Am. Med. Ass'n*, Apr. 20, 1918) and seems to me to be of such value that I feel justified in quoting from it quite extensively:

"The conclusions deduced from these experiments may be thus outlined:

When a piece of *living bone* has been separated from its circulation and implanted elsewhere in the body of the same patient, the immediate result, as indicated in specimens recovered within a

Figure 1.

few days of the operation, is the coagulation of all cells and vessels to which the surrounding lymph is unable to percolate. This means the *death* of all the cells in the lacunae and most of those in the haversian canals. This is indicated by the immediate change in the staining property of the protoplasm and nucleus, and is later proved by the complete absorption of these structures after the lapse of from three to four weeks.

On the *surfaces* of the graft and in the open mouths of the haversian canals, however, are many *osteoblasts* which are in a position to absorb nutriment from the bathing lymph, and these cells are capable of living and proliferating and of producing those changes that make the autogenous graft so valuable in reparative surgery. At the end of the *first ten* days after the implantation of

the graft, the proliferation of these osteoblasts is well established on the periosteal and endosteal surfaces, and within a few days *new bone* formation can be plainly seen on these surfaces. In addition to forming new bone about the transplant, these proliferating osteoblasts proceed to attack the *dead* bone of the grafts and rapidly produce *excavations* about the edges which are at first filled with proliferating cells and later by new bone laid down by these cells on the walls of the excavation..

While these changes are occurring on the surface, a *re-establishment* of the *circulation* has been taking place as the result of the ingrowth of new blood vessels into the mouths of the haversian canals. This proceeds with extraordinary rapidity, and in small,

Figure 2.

porous transplants is complete in approximately *two weeks*. Along with these blood vessels the osteoblasts spread inward from the surface, and at the end of *two weeks* the same changes that have been described on the surface are occurring *within the substance* of the bone. At first cavities are excavated along the course of the haversian canals, not far below the surface of the bone. Later, this cavity formation, which appears to be a solution of the bone by a secretion from the proliferating osteoblasts, spreads into the transplant until ultimately the whole graft is permeated by blood vessels and osteoblasts that are occupied in the absorption of the dead bone. A few days after the formation of a cavity by these proliferating osteoblasts, the older cells return to their adult func-

tion of bone production, and soon the older part of the cavity becomes lined with a layer of new bone. This layer increases in thickness, and trabeculae develop from wall to wall until the whole cavity is filled with living cancellous tissue except in those areas in which the proliferating cells are continuing the work of excavation. (Fig. 2.)

The rapidity with which these changes occur depends on three factors: The *size* of the graft, its *density*, and the *abundance* of the supply of osteoblasts that survive on the surface. Of the greatest importance, however, is the abundance of the supply of living osteoblasts on the surface. Thus, if the transplant is cut in such a way that the endosteal and periosteal surfaces are undisturbed and exposed to a good supply of lymph, the changes described above occur with certainty and rapidity.

When the grafts are placed in good contact with living bone, the changes described occur much more rapidly, evidently because of the additional supply of osteoblasts arising from the bone in which the graft is embedded.

Here the vexed question of the periosteum presents itself. The results of these experiments agree completely with those of Macewen, indicating that the periosteum as viewed by the surgeon is only a limiting membrane composed of fibrous tissue, and that the great majority of the sub-periosteal osteoblasts cling to the bone when the periosteum is removed. This view has been further substantiated by a series of experiments in which bone was transplanted *with* and *without* periosteum into the muscles of the back, and the amount of osteogenetic activity on the periosteal surface compared. These experiments showed that the value of the graft from the standpoint of osteogenesis was the same in the two cases. We are therefore in the habit of transplanting the bone without its periosteum, using the reflected periosteum to cover up the space left by the removal of the graft."

A Case of Frontal Empyema with Extensive Bone Necrosis and External Fistula, Operated upon Externally in Several Sittings. Cure of Condition with Excellent Cosmetic Result: A. M. W., a white youth, aged 20 years, was referred to me by Dr. Henry F. Hill, April 28, 1914, with the following history: In June of the preceding year (1913) he had an itching of the upper angle of the left eye, succeeded in two days by great swelling over the eye, diagnosed as erysipelas.

After a week this was incised by Dr. Hill, followed by the discharge of a large amount of pus.

The patient was desperately ill with high temperature and an autogenous vaccine was employed as a part of his treatment.

Ever since his recovery he has had a small fistula in the forehead of left side to the left of the median line, usually covered by a crust. He is now in good general health and feels as well as ever; has no pain nor cerebral symptoms.

Says that there is a slight nasal discharge at times bloody from the left nostril.

Examination: The interior of the nose looked normal, there was no pus, and the probe did not discover diseased bone. After removal of a small crust, an external fistula the size of a knitting needle was found above the root of the nose to the left of the median line; a probe inserted through this detected bare bone and entered a large cavity, the left frontal sinus.

Operation was determined upon and performed April 29, 1914, at the University Hospital.

A curvilinear incision was made along the left eyebrow (not shaved) and a vertical extension made from the inner end of this through the fistula, producing a triangular flap.

The fistula was surrounded by granulations and bleeding was profuse. The bone fistula was enlarged with chisel and forceps, and a sequestrum of the intersinus septum was removed, so that a probe could readily be passed into the opposite sinus.

The left sinus was filled with pus and large granulations resembling brain tissue, which were removed with a spoon.

The right sinus was also opened at its inner angle by a limited incision and looked healthy.

Both sides were packed temporarily with gauze strips, but the right side was closed in two days.

At the dressing on May 7, the left sinus seemed to be granulating and the outer portion of the incision was sewed up.

The patient was discharged from the hospital and treated ambulatory. The left sinus was dressed at appropriate intervals, either by myself or various hospital residents.

At first iodoform gauze strips, later Peruvian balsam were used for packing.

Despite these measures, continued for nine months, bare bone presented on the posterior (cerebral) sinus wall and at the floor of the sinus, and it became evident that further operation was required.

On January 9, 1915, I performed a modified Killian operation on the left sinus at the Baltimore Eye, Ear and Throat Hospital.

This was a very extensive and tedious performance, lasting over three hours and complicated by the collapse of the patient on the table.

The entire sinus floor was removed, the inter sinus septum and the upper portions of the nasal process and nasal bone were curetted with a bone spoon.

All of these bones were bare but very dense.

The anterior half of the left middle turbinal and adjacent ethmoid cells though apparently healthy were removed through the wound for good drainage.

The usual drains and dressings were applied and the patient was able to leave the hospital in ten days' time.

Subsequent dressings were carried out at the dispensary and on February 1 (3 weeks), the bone was seen to be covered with healthy granulations, there was free drainage into the nose, and the greater part of the external wound was closed by secondary suture.

The patient was furnished with a syringe for home irrigation, and directed to report to the hospital for treatment and inspection, at increasing intervals.

Uneventful progress ensued until June 14, 1916, (18 months) when the patient returned with a painful swelling over the *right* eye and pus in the *right* nostril.

The tip of the right middle turbinate was resected with Sluder's knife under local anesthesia, and a hot compress and nasal douche employed; it became necessary, however, to reopen the sinus externally and apply drainage.

It shortly became manifest that something further must be done to cure this patient.

On July 11, 1916, I undertook what I had determined should be my final operation, under ether anesthesia at the Baltimore Eye, Ear and Throat Hospital.

Both sinuses were reopened externally—on the left side scar tissue had to be loosened up and dissected out of the depressed fistula.

While the left sinus had largely healed, bare bone could be detected with the probe, at the root of the nose and on the posterior sinus wall.

All granulations were removed from both sinuses with a curet, and the left posterior (cerebral) wall curetted as vigorously as seemed safe. The nasofrontal openings upon either side were enlarged to the fullest extent with a burr.

2. The posterior (cerebral) sinus wall was denuded but was hard and seemed devitalized rather than necrotic (osteosclerosis?). It took a very long time for it to regenerate, but my own judgment and the advice of colleagues was that it was better to delay than to assume the risk of removal.

3. Marked anesthesia of the operative field; the packing was for a long time painless, doubtless due to the devitalized bone.

4. Excellent cosmetic result.

A Case of Fracture of the External Bony Framework of the Nose and the Nasal Septum by the Kick of a Mule, Causing Depression of the Tip of the Nose and Great Disfiguration. Restoration of Appearance and Function by Operation: James C., a country lad, aged 19 years, was admitted to my service in the University Hospital, July, 1917, with the history of having come into conflict with the business end of a mule two days previously, in consequence of which he presented a broken and badly lacerated nose. The median third of the lower end of the nose was cut out into a tongue shaped flap and mashed down upon the face; the upper and lower lateral cartilages were cut through and left erect, thus forming a trough at the end of the nose.

The left nasal bone and the edge of the pyriform aperture were fractured. The bony septum was fractured and the cartilaginous septum was smashed to smithereens.

In consequence of these injuries both nares were practically obliterated by a red pulp like swelling.

The nose was thoroughly cleansed, and under ether, the septum and nasal bone were elevated with septum forceps.

The depressed triangular flap was elevated and sutured, then covered with iodoform collodion.

As the nose looked infected, it was at first packed with iodoform gauze; later a metal splint was inserted into the nares, and a metal support over the bridge of the nose.

The stitches were removed within a week's time, when primary union had occurred and the patient was left with a nose fully as beautiful as the one which he originally possessed.

This belonged to that underdeveloped, shortened variety termed "snub" nose.

Whether or not this type is usually associated with low mental development or degeneracy, as has been stated, it certainly was in this case. It was impossible to impress upon the patient the importance of his treatment and he insisted upon leaving the hospital without my consent and at his own risk.

The basal remnant of the intersinus septum, the anterior frontal spine, and the uppermost portion of the nasal septum, were removed with forceps (Citelli) and burrs.

This seems to be approximately what is known as Lothrop's operation, which I was not familiar with at that time.

I determined to close the left wound by a plastic operation and leave a small opening at the inner angle of the right wound for a drain.

A gauze pad was put over each eye, but permanently removed from the left side the following day.

On July 14, 1916, the stitches were removed and healing per primam had occurred; there was a fistula the size of a slate pencil on the right side and of a knitting needle on the left.

No further external dressings were applied, only a small drain on the right side.

On July 20 he was thoroughly examined. A probe could be passed into either sinus and across into the opposite one, also down into either nostril.

Fluid introduced into either sinus ran out of both nostrils.

All drains were removed, the patient furnished with a syringe and directions for self-treatment.

Subsequently he was seen only at long intervals and had no trouble until October 31, 1916 (3 months) when he returned with a moderate yellow discharge from a minute pin size fistula in the left side, through which the patient was unable to irrigate the sinus successfully.

The opening upon the right side had completely closed.

I irrigated the sinus a number of times with weak iodine solution, by means of a fine Devilbiss irrigating syringe, and then furnished the patient with a gold dental root syringe for home use.

There was free drainage through both sinuses into and out of each nostril.

The minute fistula caused no disfigurement and it was thought best to leave it as a safety valve.

Since this period I have not treated the case, but have seen him on several occasions.

He has meanwhile married and was well when last seen, June 30, 1917.

Several interesting points were presented by this case:

1. Lack of intra nasal pathologic conditions. A virulent infection (erysipelas) seemed to have attacked the frontal sinus and uppermost portion of the bony framework of the nose, without involvement of other nasal tissues.

At this time he was breathing well and the cosmetic result was good.

In January, 1918, he was seen at work by a patient of mine, and *seemed* to be all right.

This case illustrates the remarkable vitality of the nasal tissues and how much can be accomplished even in apparently bad conditions. The tissues looked infected, and I greatly feared their destruction with terrible deformity.

A Case of Fracture of the Right Nasal Bone and Nasal Process and a Portion of the Orbital Process, by an Iron Rod; Formation of Sequestra and Abscess, with Secondary Infection of the Right Antrum. Operation and Cure, with Good Cosmetic Result: James W., aged 14 years, was referred to me by Dr. Albert T. Chambers, with the history of having been struck upon the chin and face four or five months previously by an iron rod of a revolving merry go round. For several months he has had an ovoid swelling along the right side of the nose, presenting a fistulous opening at the lower extremity, discharging pus.

On probing through the fistula bare bone was detected, and the probe entered the right naris.

The right eyelids were much swollen, nearly closing the eye.

Operation was performed November 20, 1917, under ether, at the Franklin Square Hospital, Dr. Furneyhaugh assisting.

The abscess was incised along its extent and a lateral rhinotomy done, removing the necrotic right nasal bone and a portion of the nasal process of the superior maxillary bone, also a sequestrum comprising the inferior inner rim of the orbit.

The right antrum was opened through the nose, irrigated, and a drain inserted.

The external nasal wound was sewed up, except at its uppermost extremity which looked suspicious, and a small drain was inserted.

This was covered with a dressing, but the greater part of the wound was closed with collodion cotton.

The wound was dressed and nose irrigated at appropriate intervals by Dr. Furneyhaugh until November 28, when the patient left the hospital.

December 4 the external wound was healed by primary union except a small fistula at the uppermost extremity, the edges of this were scraped with a knife and the patient sent home.

December 14 the patient's mother reported by letter that he "was doing finely and the wound had closed."

RECURRENT TERATOMATOUS GROWTH OF THE TRACHEA.*

DR. WOLFF FREUDENTHAL, New York City.

The patient, whose history I take the liberty of reporting here, has been presented to the Section on Laryngology of the New York Academy of Medicine on several occasions, the last time in February, 1915.

As the case is interesting, not only from the point of view of this society, but also from the standpoint of the pathologist, the anamnesis will be given in detail.

S. F., a tailor, aged 27, had been tracheotomized in Russia on account of diphtheria, when he was 14 years old. Following the operation he felt well up to the time that he presented himself for treatment in one of my clinics in 1913, i. e., 5 years later. Shortly before consulting me he had suffered from dyspnea, especially on exertion. His voice was clear, and everything else normal. Examination revealed, about an inch below the glottis, a web-like grayish looking mass, that included the greater part of the trachea, with only a small opening anteriorly—all this apparently due to the former tracheotomy. Nose and throat were normal.

In order to remove the mass he was placed under suspension laryngoscopy, and it was interesting to me and to all those that saw the case, to notice the change in the appearance of the web. While under ordinary inspection it looked like a thin, grayish membrane, under suspension it appeared reddish and of some dimensions. It seemed quite easy to remove the mass under suspension, but the patient absolutely refused any operative intervention without a general anesthetic. This was given a few days later, but the patient became cyanotic to such a degree before we had begun the operation that a hurried tracheotomy had to be done. All of the visible mass was then removed and everything thoroughly cauterized. The wound healed and the patient was soon discharged, breathing normally.

A year later he returned in the same condition, and again all the visible growth was removed under general anesthesia, this

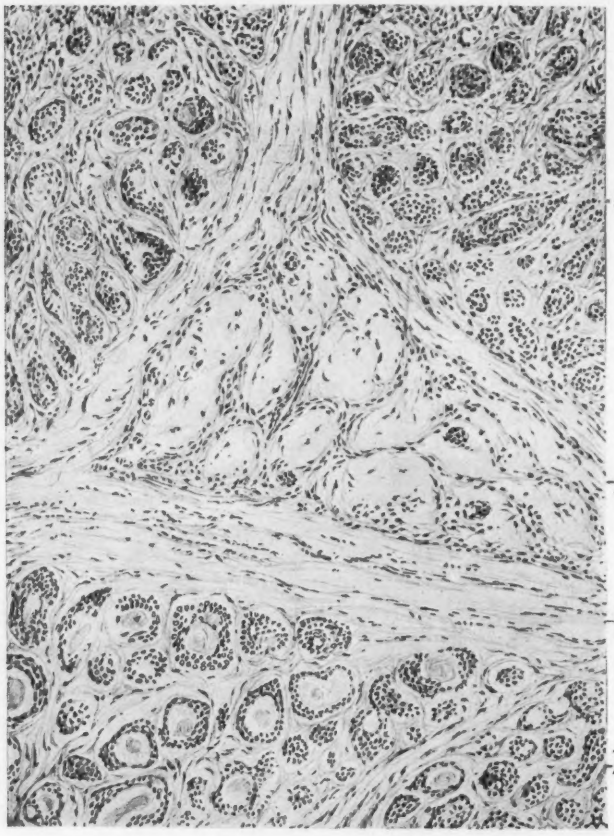
*Read before the Association of American Peroral Endoscopists at its first meeting held in Philadelphia, May 31, 1918.

time under suspension. Nine months later he showed up again, and naturally we began to be suspicious of the nature of the condition. The patient was put under rectal anesthesia, and with a straight tube an effort was made to extirpate all of the intra-tracheal mass. The bleeding, however, was so profuse that the attempt had to be abandoned before any large amount of the mass had been taken out. A few days later, he was again placed under general anesthesia (rectal), and the trachea opened, three rings of the trachea being incised this time in order to get free access to the growth. Great masses of granulation tissue were found and removed with very little hemorrhage. The pathologist reported the growth to be an endothelioma.

It was then a question as to what should be done,—whether to remove the affected portion of the trachea and then apply radium, or to give radium a trial first. After consulting with several colleagues, it was decided to use the latter method for 24 hours. This seemed to have a very good effect; everything appeared in good condition and the patient was discharged. He reported at the clinic regularly. When seen in January, 1915, there was nothing abnormal to be found in the trachea. Three weeks later, however, a new mass was found to be springing up from the lateral wall, and another one anteriorly. I stated at that time that this was undoubtedly a recurrence of the endothelioma. The question again came up, whether radium should be tried or a part of the trachea removed.

At this stage he was demonstrated before the Section on Laryngology of the New York Academy of Medicine and I remember the remarks made by Dr. Thomas J. Harris, that if he himself were the victim of such a condition he would prefer to be let alone. His statement was based upon his experience with a similar case seen by him at the clinic of Professor Chiari at Vienna. But we could not leave this young man alone, since the tracheal stenosis was increasing and the use of radium at this stage was not without danger. Consequently, he was operated again on April 14, 1915, by Dr. C. Goodman and myself (intratracheal anesthesia). A median incision was made, the trachea separated from the surrounding tissue, which was difficult owing to the adhesions, and then opened. The tumor, which was situated on the right wall of the trachea, was soft and irregular and extended over an area of two tracheal rings, both of which were resected, leaving the posterior membranous wall

intact. Healing again was uneventful and there was no trouble for several years, for which the patient was grateful. In fact,



In the center of the drawing there is a small plaque of embryonic cartilage with typical cartilage cells imbedded in a hyaline matrix. A capsule of fibrous connective tissue bounds the cartilaginous mass. The rest of the field is made up of numerous tubules lined by several-layered epithelium and filled with a mucous secretion. The supporting frame-work is made up of mucous connective tissue. A. Cartilage. B. Young fibrous connective tissue. C. Epithelial cylinders. D. Tubes filled with mucous secretion.

he looked and felt so well that when he was called for examination for the army early in 1918, he would have been drafted had it not

been for the intervention of one of my younger assistants, who had been present at the last operation and recognized him. However, a slight dyspnea had already set in at that time and was getting worse quickly. He was planning to get married and demanded a radical operation. The tracheoscopic picture now was a most interesting one. Below the glottis there appeared what might have been mistaken on superficial examination (in fact, was) for another glottis. About an inch below the glottis on the left side, there was a whitish mass almost reaching to the centre of the lumen of the trachea, which looked very much like a vocal cord. On the right side was a smaller one, somewhat congested and, of course, also immobile. On deep inspiration, when nothing was seen of the true vocal cords, these neoplasms could easily be mistaken for them.

What was this white mass on the left side? Was it cicatricial tissue or was it cartilage, i. e., a portion of a tracheal ring that had been cut through? Either assumption was possible. The cicatricial tissue outside on the neck was very evident and there had been a great deal of cutting of cartilage in the different operations. The microscopic examinations of the tissue cleared up these details.

After attempts to stretch the stenosis by long intubation tubes and von Schroetter's bougies, which I was forced to give up owing to the resistance of the patient, nothing was left but to operate again. That was done, but unfortunately he died soon afterwards from a hemorrhage. The specimens that were removed were sent to Dr. J. H. Globus for microscopical examination, who kindly furnished me with the following report: "The fragments do not suggest in any way the organ from which they were removed. Microscopic sections present several interesting features which led to the diagnosis of a teratomatous growth. In certain areas the sections present cylindrical structures filled with mucus and lined with several layered epithelioid cells supported by a rich stroma of a mucoid character. In other areas solid cords of epithelioid cells are seen supported by a mucous connective tissue stroma. Still in other fields plaques of embryonic cartilages are found. The presence of embryonic cartilage, the mucous connective tissue and the peculiar arrangement of the epithelioid element suggest the diagnosis of a mixed tumor. Diagnosis: Myxo-chondro-cylindroma. (Endothelioma)."

From this description we learn that plaques of embryonic cartilaginous tissue were present, but no true cartilage was found. We, therefore, concluded that the white mass seen intratracheally consisted both of enoplastic and scar tissues.

In the literature I was able to find only two cases resembling mine pathologically, that is the case of Henrici and that of Heymann. (The one described by Dr. Goodman in the Annals of Otology is my own case.) The nature of the pathological structure in Chiari's case is not mentioned. But there is a doubt in my mind, whether Henrici's and Heymann's patients belong to the same class as mine, since of late the nomenclature has been changed. Under the new classification my case here comes under the general group of teratoma, and its special nature is that of a myxo-chondro-cylindroma.

This type of neoplasm has been frequently seen in the parotid gland, but as far as I could find out, never in the trachea. It is not actually malignant, as it does not form any metastases, but it recurs repeatedly and in that way renders the prognosis doubtful.

The great value of the direct methods in operative work and direct medication in the lower air tract has been demonstrated at our meetings this week by the great variety of reports given. These methods have come to stay. Is it, therefore, too premature to speak of some limitations in this field, at least so far as tracheal work is concerned? In this case of mine very little was accomplished under local anesthesia, as he was exceptionally unruly. But even under a general anesthetic the attempt to extirpate the neoplasm had to be given up on account of severe bleeding. In Heymann's case the tumor was removed in two sittings by the straight method, but recurred so soon that Gluck had to open the trachea and extirpate the growth radically.

In spite of these experiences I should feel inclined to try either one of the direct methods again, should a similar case come under my observation. It seems plausible that in connection with other means, the galvanocautery, for example, if applied carefully under a local anesthetic by means of Lynah's galvanocautery point, should prove of value in non-malignant cases.

59 East 75th Street.

A CASE OF MENINGITIS TREATED BY LABYRINTHECTOMY AND DECOMPRESSION.

Dr. Charles E. Perkins, New York City.

The patient whose case is the subject of this report was a young man seventeen years of age, a private patient of Dr. Edward B. Dench, who came under my care in the Plant Pavillion at St. Luke's Hospital on July 7, 1917. He had had a purulent discharge from his right middle ear for a number of years following measles in childhood. This apparently ran without complications until early in June, i. e., about one month previous to admission. Then he developed vertigo and a facial paralysis on the involved side. About two weeks later a radical mastoid operation was done in a neighboring city. He did well after this interference and was discharged from the hospital on the tenth day. His vertigo had disappeared and the facial paralysis had nearly cleared up.

On July 4, three days before I saw him, he was taken with a severe headache and fever, both of which symptoms continued until his admission to the hospital, at which time he was moaning with the pain in his head and throwing himself about with some violence. His temperature was 102°, the neck was stiff, and he was mildly delirious, although he answered questions readily. Hearing in the right ear with noise, apparatus in the left, absent. Caloric reaction negative on the right side; no spontaneous nystagmus or overpointing.

It was thought that there could be no question but that he had meningitis following supparative labryinthitis; nevertheless, his spinal fluid showed a leucocytosis of 15 cells, 12 of which were polymorphonuclears; butyric test mildly positive. Culture of this fluid afterwards proved to be negative. On acount of the spinal fluid report, although meningitis seemed clinically present, operation was deferred.

On the following day his symptoms were no better and as the report on the spinal fluid was 512 cells to the cubic millimeter, I determined to operate. Operation: Old radical cavity exposed by posterior incision and cleared of granulations. Lateral sinus exposed. Bone removed from Trautman's triangle. Posterior semi-

circular canal opened and removed, also posterior end of horizontal. estibule entered from behind. Dura in the internal auditory meatus exposed, as also was that in the middle fossa well up beneath the squama. Promontory removed and modiolus curetted out. The dura in the posterior fossa incised from about the middle of the internal auditory meatus to near the lateral sinus. Cerebellum bulged into the incision. Small folded rubber tissue drain inserted. No marked amount of spinal fluid escaped. Crucial incision of dura in middle fossa. Some escape of spinal fluid; marked bulging of brain through incision.

The following day, the 9th, the temperature fluctuated between 101° and 104°, spinal fluid cells 2000. Butyric positive. On the 10th, temperature 103° to 104.8°, spinal fluid cells 3,500. Butyric test positive. Smear gave many pus cells and a few gram positive diplococci; slight opisthotonos. Wound redressed brain tissue of temporo-sphenoidal lobe sloughing with foul odor. Dakin's solution was used at the suggestion of Dr. Dench. The wound was lightly packed with gauze soaked in the solution, surrounding two rubber tubes which were allowed to protrude from beneath the dressing. The ends were covered with pads of gauze which were removed every two hours for the installation of the Dakin solution.

On the 11th, the odor of the wound was much less; temperature 101° to 103°, opisthotonos so extreme that lumbar puncture was unsuccessful. Patient appeared stronger and slightly better mentally. From this time on improvement continued. The wound rapidly grew better under the Dakin's solution, which was continued for about three weeks. The brain hernia became very much reduced in size and became covered with healthy granulations and epithelium. The brain prolapse had divided the posterior opening from the radical cavity, the latter dermatized over leaving a dry ear. A small posterior sinus persisted which nearly became dry, eventually discharging but a drop or two of pus in 48 hours. This seemed to lead to the region of the internal auditory meatus and was believed to be due to some slight amount of bone necrosis.

He left the hospital August 24, one month and sixteen days after the operation, apparently in fine condition. About three weeks after this the upper wall of the radical cavity prolapsed, evidently from pressure of fluid. The ear, however, remained dry for another three weeks, when a serous discharge began and continued until death. He also began to complain of headache and vomiting.

He was readmitted to the hospital on September 26. The reports on lumbar punctures were as follows:

Sept. 26, leucocytes 15, lymph 100%, butyric; culture 0
Oct. 4, leucocytes 10, lymph 100%, butyric; Wasserman negative.
Oct. 9, leucocytes 7, lymph 100%, butyric; culture 0.
Oct. 17, leucocytes 8, lymph 100%, butyric.
Oct. 18, fluid bloody.

His eye grounds were negative. A neurologist went over him and discovered nothing. Dr. Hollis treated him for an acidosis by lavage and sodium bicarbonate without much beneficial effect on his symptoms although his urine which had contained acetone and diacetic acid on three successive days showed improvement.

Earnest solicitation failed to obtain permission for further surgical intervention. He became comatose and about 36 hours later died, October 20, 1917. No autopsy was allowed.

Several points about this case seem worthy of mention. This patient developed meningitis, following a suppurative labyrinthitis, which passed into the latent stage and was associated with facial paralysis. There seems no valid objection to assuming that the route of infection was through this dead labyrinth. The peculiar feature is that for three days there was intense headache, fever, stiffness of the neck, etc.; in fact, a clinical picture of meningitis and yet the spinal fluid showed but 15 cells to the m.m. Twelve of these were however polymorph nuclears. I did not at the time feel justified in operating with this count even though meningitis seemed, from the symptoms to be present; about 20 hours later, as the report from the laboratory was 512 cells to the m.m., I did not hesitate, but did the labyrinthectomy with cerebellar and subtemporal decompression. The question arises, should I not have operated with the symptoms present together with a spinal fluid count of 15, 80% of which were polymorph nuclears. My opinion is I should.

Two days after the operation the brain was sloughing and foul smelling, altogether a mess. The effect of the Dakin's solution was marvelous, judged from the old standards. The brain became firm and healthy and dermatized over. There was, however, so much sloughing of the cerebral substance that the lateral ventricle must have approached the radical cavity and the pressure of the cerebrospinal fluid caused a prolapse of the superior wall with seepage through the ear. This was not in sufficient amount to cause headache or did death result from reinfection of the meninges as the spinal fluid remained clear throughout. The exact cause of death is to me obscure. The fact that it was not meningitis leads me to claim a cure from that disease although the patient died three and one-half months later from some other condition.

616 Madison Avenue.

DISEASES AND DEFORMITIES OF THE NOSE VERSUS NEURALGIA OF THE HEAD.*

DR. FRED STAUFFER, Salt Lake City, Utah.

I have long been impressed with the importance of a more restricted use of many words denoting symptoms, which through common usage have assumed the role of disease classification.

Among these, there is perhaps no word which has been more misused than that of "Neuralgia."

We all know how common is the practice of diagnosing all kinds of diseases about the head which cause pain, as neuralgia, and prescribing some favorite analgesic to relieve the symptoms without due regard for diagnosing the underlying cause and directing the remedies at the disease instead of attacking the symptoms.

Though my purpose may not be well expressed in the title of this paper, I shall endeavor to point out the fact, that when all the head pains or neuralgias occurring as a result of diseases and deformities in the nose and its accessory sinuses are accounted for, there will be but few to attribute to other causes.

Gould's definition of neuralgia is: "Severe paroxysmal pain along the course of a nerve and not associated with demonstrable structural changes in the nerve."

The word has also been used to indicate conditions in which such pain exists as a pure neuroses, to distinguish it from the cases in which inflammatory and degenerative changes are present in the nerve, to which class the name of neuritis is applied.

Pain may be regarded as a reaction of the organism, in part or as a whole, to harmful influences, giving a warning in consciousness that some activity prejudicial to the health of the tissues is operative.

Biologists say that the movements of expansion and contraction of protoplasm are primordial expressions of the pleasure and pain. sense; expanding to pleasure giving, and contracting to pain giving or harmful impulses. Hence, any agency in the system which through pressure, chemical or other irritation, causes undue contraction of the nerve protoplasm, tends to cause pain.

*Read before the American Academy of Ophthalmology and Oto-Laryngology, Pittsburg, Pa., Oct. 30, 1917.

Sensations of pain are conveyed to the brain centers through the afferent, or sensory nerves and the pain is referred to the origin of the nerve fiber whether the irritant is applied to the periphery or to any part of the nerve in its course to the brain.

The trigeminus is the great sensory nerve of the head and face, and through its ramifications are conveyed to the brain all manifestations of common sensation in health; and the sensations of pain, expressed in enuralgia, when its protoplasmic elements are disturbed by disease of the surrounding tissues.

A knowledge of the origin and distribution of this nerve is imperative for a proper understanding of the various obscure reflex pains associated with diseases in the head.

In view of these facts, I make no apology for a brief review of the anatomy of the sensory branches of the fifth nerve.

It is the largest of the cranial nerves and takes its superficial origin in the Pons Varolii nearer to the upper than the lower border. It consists of about one hundred bundles of fibers, which have their deep origin from a nucleous in the pons just below the floor (internal), to the margin of the upper half of the floor of the fourth ventricle.

From its superficial origin it runs forward through an oval opening in the dura on the superior border of the petrous portion of the temporal bone to its apex, where it merges into the Gasserian ganglion, which latter is lodged in an oval depression at the apex of the petrous bone in the middle fossa. This ganglion receives filaments of sympathetic nerves from the carotid plexus and gives off minute branches to the tentorium cerebelli and to the dura mater in the middle fossa of the cranium. From the anterior border of the ganglion are given off the three main branches, viz, the ophthalmic, superior maxillary and inferior maxillary nerves.

The first, or ophthalmic, division supplies the eyeball, the lachrymal gland, the conjunctiva, the mucous lining of the upper and anterior part of the nasal fossa, and the skin of the upper eyelid, tip of the nose, eyebrow, forehead, the muscles, skin and pericranium of the frontal and parietal regions.

The superior maxillary, or second division, emerges from the infraorbital canal and supplies the skin of the lower eyelid, side of the nose and upper lip. In its course, it gives off branches which supply the skin on the cheek, and temporal region and through the dental branches, supplies all the upper teeth, the mucosa of the antrum of Highmore, and through the sphenopalatine ganglion it supplies the mucosa of the soft palate, the gums, roof of the mouth,

nasal septum and the posterior two-thirds of the outer wall of the nose, including the sphenoidal and ethmoidal sinuses. It also sends branches to the tonsillar plexus and upper part of the pharynx. The sensory part of the third division, viz, the inferior maxillary nerve is distributed to the teeth and gums of the lower jaw, lower part of face, the integument of the external ear and temple. It also supplies the tongue with a large branch, the lingual nerve. It will be observed that all these divisions, as well as the Gasserian ganglion itself, give off branches to supply the dura and pericranium of the middle fossa, as well as the tentorium cerebelli.

To recapitulate, the whole area from the lower border of the inferior maxilla, including the face, forehead, frontal and parietal and temporal regions, as well as all the contents of the orbits and nasal cavities; the mouth, and upper part of the pharynx, receive their sensory nerve supply from the fifth pair of cranial nerves. Irritation of any branch of this widely distributed sensory nerve may cause pain referred to any other branch by reflex irritation.

While the *modus operandi* of this phenomenon is not perfectly clear, there is a more or less uniform symptomatology from certain specific causes which bring about these reflexes.

Referring again to the definition of neuralgia, it is difficult to conceive of pain in the course of a nerve as a pure neurosis (whatever that means), without a lesion either in the nerve endings or nerve fibers in their course to the sensorium.

Taking as a basis for discussion the hypothesis that pain sensations are caused by influences which cause contraction of the protoplasm, we may account for many neuralgias, where no demonstrable lesion of the nerves is present.

Some of the predisposing causes of neuralgia are anemia, which acts by impoverishing the nutrient fluid and overcharging it with acid products; the presence in the blood of abnormal substances, as in gout and diabetes; also the products of imperfect metabolism. Such diseases as rheumatism, syphilis, arteriosclerosis and all conditions which interfere with proper nutrition of the nerves, may of themselves cause neuralgia.

To the rhinologist, it is more important to discuss the subject from the standpoint of peripheral infection, especially the irritation which comes from pressure in deformities in the nasal cavities and from pent up pus in the accessory sinuses.

Since pain is the leading symptom for which patients consult the doctor in all these conditions, I can best serve my purpose by describing the character and location of the pain which, according to my observations, are fairly reliable diagnostic aids.

The pain in acute frontal sinusitis, or in the acute exacerbation of chronic inflammation, is described as dull, heavy, throbbing in character and is intensified by body movements which tend to increase congestion, such as stooping forward, or in jarring the body, as by running or jumping. The pain is usually limited to the region of the sinus itself and is greatly increased by pressure over the floor of the sinus at the upper inner angle of the orbit.

One of the most characteristic symptoms of frontal sinus pain is its periodicity; starting usually between nine and eleven o'clock in the morning, reaching its greatest intensity early in the afternoon, and disappearing before 6 p. m. without treatment, only to recur on each succeeding day, until the pathology is relieved by spontaneous evacuation of the pus, or by the aid of the physician.

The pain is often as intense in the congestive stage of an acute frontal sinusitis, before pus has formed, as it is in the later stages when the pain is ascribed to back pressure of pus. In the former case, the pain is probably due to congestion of the mucosa because of vacuum in the sinus resulting from closing of the infundibulum and absorption of the contained air. At any rate, the pain is often relieved and suppuration aborted by applying astringents to the nasal mucosa at the infundibulum, whereby the air passage is re-established.

As before observed, the pain in frontal sinusitis is usually located directly in the region of the sinus, without reflex pains, to the other parts of the head; hence the diagnosis of this disease from the pain alone, when present, is easily made. The same may be said to a limited degree of maxillary sinusitis. There is usually a dull, heavy, boring pain below the orbit which may or may not be increased upon pressure over the canine fossa.

While the pain is usually most pronounced over the antrum on the cheek, it may be entirely absent there and be referred to the supraorbital region or along the backward extension of the superior maxillary nerve which supplies the antrum.

Nevertheless, the pain in maxillary sinusitis is not often misleading nor wholly deferred to distant parts. In this respect the sphenoidal sinuses and posterior ethmoidal cells differ materially from the frontal and maxillary sinuses.

Careful observation and study of pain arising from irritation in the sphenoidal and posterior ethmoidal sinuses has led me to look for and find pathology in these cavities when there was not the slightest suspicion on the part of the patient or his family physician of the location of the disease.

While the pain may be located in the region of the sinuses, it is more often referred to the parietal or occipital regions.

Every rhinologist can recall patients who applied for ear treatments because of pain referred to the middle ear or to the mastoid bone, when upon examination the ears were found perfectly normal and the lesion was found in a diseased sphenoidal or posterior ethmoidal sinus.

The pain from pent up pus in the sphenoidal sinuses and posterior ethmoidal cells is often intense and throbbing or boring in character and it is nearly always referred either to the occipital, mastoid or parietal region of the same side as the involved sinus. In contradistinction to the frontal sinus pains, they are usually more severe at night while the patient is in a reclining position.

I report the following case as typical of a class to which I wish to draw special attention, because of the great frequency with which the real lesion is overlooked and the symptoms attributed to other causes.

Mrs. J. E. S., age 30, mother of three healthy children, came for treatment with a history of having had severe neuralgia in the left side of the head radiating from the base of the middle fossa up to the occipital, parietal and frontal regions of the head for a period of three years with only occasional remissions. This pain had been so severe and long continued that the patient as well as her husband feared insanity would be the result.

She had been to numerous opticians and oculists, who prescribed various lenses and ran through the category of analgesics, with only temporary relief of pain. This patient denied having any trouble in her nose, but was convinced that the cause of her trouble was in her eyes; if not her eyes, then there must be a lesion in the brain.

On first examination, Dec. 5, 1914, I found an error of refraction which was corrected by +.75 sph. in right, and +.50 sph. with +.37 cyl. ax 90 in left. As the patient gave a negative history, I made no examination of her nose at this time, but finding this error of refraction, I contented myself with prescribing the proper correcting lenses in the hope that these would bring the desired relief.

On Feb. 16, 1915, the patient returned, reporting that the headaches continued on the left side as before. At this time careful examination of the nose was made and the nasal septum was found to be deflected to the left high up, causing considerable pressure on the left middle turbinal and its impaction was so great that it wholly obstructed the opening of the sphenoidal sinus. Closer examination revealed some pus in the region of the left sphenoidal sinus opening.

I performed a submucous resection of the nasal septum, removed the impacted middle turbinal, and enlarged the opening of the sphenoidal sinus. This procedure gave prompt relief of the pain for several months.

On October 23, 1915, the patient came back completely discouraged, now having pain on both sides of the head. Up to this time she had never had pain on the right side. She now was suffering from an acute coryza. Upon shrinking the nasal mucosa, it could be seen that the right middle turbinal, which was hypertrophied before the submucous resection was done, had become impacted as a result of moving the septum towards the median line and now there was an acute suppuration in the right sphenoidal sinus as well as an acute exacerbation of the left sphenoidal sinusitis, which condition caused the pain in both sides of the head. At this time the right middle turbinal and also the whole of the anterior walls of both sphenoidal sinuses were removed. After a period of daily treatments extending over several weeks, the pus discharge from both sinuses cleared away and with re-establishment of normal ventilation in these cavities, the pains in the head entirely disappeared and the patient has been perfectly well and happy for the last two years. It required a good deal of will power to convince this patient that her symptoms would not return.

I can give histories of scores of similar cases with equally good results following operation in the nose which had as their main object proper drainage and ventilation of the accessory sinuses.

It is because of the large number of cases of this character which have come under my observation, that I am led to believe, that a very large majority of all these obscure neuralgias (so-called) in the head have their origin in diseases of the accessory sinuses. Exostoses or deflections of the nasal septum, which cause pressure in the region of the posterior ethmoidal cells, often cause similar symptoms. Undue pressure in the region of the anterior ethmoidal cells causes pain between the orbits and in the vertex of the cranium.

The neuralgias arising from disease of the Gasserian ganglion, as expressed in tic douleureux and supraorbital neuralgias, as well as those due to carious teeth, I shall not attempt to discuss, as they are usually easily differentiated from those under discussion.

The diagnosis of diseases of the accessory sinuses is not always easy and can be made only by careful study of the clinical symptoms and physical signs. In recent years the x-ray has been extensively used in diagnosis and, while it gives valuable diagnostic information in many of these cases, I am convinced that many cases of well ad-

vanced disease of these cavities have been overlooked through laying too much stress upon the x-ray findings.

I am more than ever convinced that the court of last report in diagnosis of accessory sinus disease, must be a careful study of clinical symptoms and physical signs.

Every case with obscure head pains should be subjected to critical examination of the nasal cavities before and after blanching their mucosae with adrenalin or cocain, or both.

By this procedure it is easy to ascertain the presence or absence of the most essential elements of a healthy nose, viz: ventilation and drainage.

In the absence of either of these conditions there cannot be a normal functionating in this important organ.

The treatment, therefore, may be summed up in two words, *ventilation and drainage.*

In the presence of these conditions there cannot be pain or neuralgia such as I have described. It is the absence of these conditions that causes untold numbers of victims to exhaust the category of so-called neuralgia and headache cures with only temporary or no relief.

81 First Avenue.

Tuberculous Bronchial Glands. E. SCHMIEGELOW, *Hospitalstidende,* Feb. 6, 1918.

The symptoms of stenosis from compression by enlarged bronchial glands are the difficulty in expiration while inspiration proceeds with comparative ease; the cough which resembles whooping cough and occurs spasmodically; an area of dullness over the interscapular region; the peculiar whistling character of the respiration. With suppuration and perforation into a bronchus the patient may cough up the extruded masses and recover. But if they are too large to be coughed up the child suffocates if operative measures are not applied in time. Direct bronchoscopy is indicated at once and it may be possible to aspirate through the bronchoscope the contents of the gland that have broken through into the bronchus. Tracheoscopy is especially useful in cases developing gradually. For children under six, tracheotomy is indispensable for tracheoscopy. ED.

CONSERVATISM IN RADICAL SURGERY OF NOSE AND THROAT.*

DR. J. WILLIAM WRIGHT, Indianapolis, Ind.

The recent literature on focal infection and the excellent work done by such able investigators as Rosenow, Davis and others needs no comment but rather quite some time might be spent in words of praise and commendation for the very valuable statistics due to their untiring efforts and research.

Great as has been the relief to suffering humanity as a result of the enucleation of the infected tonsil, yet few of us there are who cannot point to some cases in which the satisfactory result was not obtained by such procedure.

Statistics show that approximately seventy-five per cent of all cases operated were given total or partial relief from their symptoms and while this is a considerable majority, it proves that we have not yet reached the point of one hundred per cent proficiency.

It is seldom that a dissatisfied patient returns to inform us of his disappointment, yet he never fails to inform his fellows that a tonsillectomy did not cure him. Owing to this unfortunate state of affairs and the knowledge of the laity in regard to the numerous tonsillectomies performed, the writer has been impressed with the idea that a more careful diagnosis should be made and a more guarded prognosis given in the obscure cases brought to our attention.

Permit me at this time to state that I have no sympathy for the old-time tonsillotome and also no leaning toward some of the newer fads, such as "circumcision" of the tonsil and "slitting the crypts." I do countenance and practice complete enucleation of the tonsil by the Sluder or modified methods and dissection, my preference being dissection.

As a result of the popularity of the infected tonsil the otolaryngologist is beginning to receive the same ridicule that the abdominal surgeon received a short time ago when he promiscuously removed the ovaries and later the veriform appendix. No doubt but that some of this criticism is unjust owing to the fact that some improper work is being done by the general practitioner or family physician, who may be totally unfit to perform such work, or incapable of making a proper diagnosis.

Within the last five years we have come to recognize the terms "rheumatism" and "neuritis" as vague and indefinite maladies meaning anything or nothing. The bacteriologists have informed us that

*Read before the American Academy of Ophthalmology and Oto-Laryngology, at Pittsburg, Pa., Oct. 29, 1917.

there are about sixty-six varieties of so-called "rheumatism" or "neuritis" and the moment we have given a patient a diagnosis of one or the other conditions we have unconsciously admitted our failure to make a definite diagnosis.

A short time after the faucial tonsils were popularized, our sister profession came forth with the infected gums and teeth and then up came the abdominal surgeon with the infected gall bladder. The so-called "rheumatic" or "neuritic" conditions we know to be due to infection and at the door of these three avenues of infection has been laid the causative factor in their production.

Patients suffering from acute articular infections or the acute inflammatory conditions following immediately or shortly after an acute focal infection can be given almost absolute assurance against such recurrence upon the enucleation of the tonsils. These, however, are not the cases which give us the most concern and for whom we are asked to advise some means of relief from their inconvenience and suffering. The subacute or chronic aching in joints, necks, arms, legs or backs in patients of forty years of age or more, are brought to us for the purpose of determining whether or not the infection is focal in origin. These are the patients with whom we should be very conservative in regard to recommending tonsillectomy, and then with a guarded prognosis.

It is the opinion of the writer that seldom, if ever, should the tonsils be removed, on suspicion that there lies the focus of infection, unless some evidence of the presence of pus may exist, or a history of tonsillar infection be obtained.

We know of a very small percentage of patients who have been injured or impaired by tonsillectomy properly performed, yet there are on record cases of arrested tubercular lesions in the chest which "flared up" following tonsillectomy. One such case was observed by the author. A man about forty-five years of age, a candidate for a national office, had a complete enucleation of the tonsils, after which he spent about two years at a tuberculosis camp, the result of enlivening a tuberculous area which had been apparently arrested for over twenty years. The author also observed an infarct which started as follows: Patient about thirty-five years of age, having had tonsils enucleated, had pain in the back over the right lung the day following. No lesion of any kind could be discovered. Patient had a temperature of 99° F. Pain persisted for a week, at which time she felt something "tear loose" or "break" and she expectorated a large quantity of pus. This continued for about four months and gradually grew less until after about one year's time she had completely recovered. She is now well and strong.

These are two cases in which a closer observation might have discouraged a tonsillectomy, especially the first one, yet all of us can point to some unusual conditions which have apparently cleared up after operation.

Second only to the so-called "rheumatics" or "neuritics" in the source of discomfort or worry to the rhinologist, are the so-called "neuralgics." These patients suffer pain, varying from a slight discomfort to one of a distracting nature which may place them in bed for one, two or three days.

The symptoms which these patients present vary to a very marked degree. Some complain of a continual inability to breathe properly through the nose and of "catching cold" easily. Others complain of a chronic discharge from the nose, while others complain of no discharge at all except a continual dropping into the throat. A few are not conscious of any nasal disturbance except it be a "drawn or tight sensation just below the eyes."

The pain or discomfort which brings these patients to the rhinologist varies from one which they can locate definitely to one indefintely located and terminating, they know not where. These pains may be constant or intermittent and may be located just above the eyes or just below and radiating outward over the lower border of the orbit. They may be located along the temporal bone, radiating to the occipital bone, or may be confined to the vertex of the skull. It is not an infrequent occurrence to have an indefinite pain covering the entire skull.

These conditions, as we all know, may be caused by several different factors, such as infected ethmoids, frontal, maxillary and sphenoidal sinuses and deviated septa with the co-existing middle turbinate pressure.

Granting that fully seventy-five per cent of head pains are nasal in origin, which percentage may be somewhat low, it nevertheless may entail some sharp differentiation between a referred pain and a localized pain. Eliminating the infected sinuses leaves us to deal with the deviated septa and middle turbinate conditions as a causative factor, which is often times a much more difficult task than it would at first appear to be.

The neglected adenoids of childhood or injuries sustained during that period, has changed the true and ideal straight septa until they are seen about as infrequently as is a dispensary patient who has not had a Wassermann. These deviated septa all have some co-existing turbinate hypertrophy. It was just a few years back that the nares were mutilated by the electric cautery and later by the indiscriminate removal of turbinates. The gradual evolution in

rhinology brought us to the more sensible procedure, that of the submucous resection of the septum.

As has been stated, it is a very common occurrence to see a deviated septum and yet it is sometimes extremely difficult to determine to just what extent this deviation is an inconvenience to the patient and how much benefit will be derived from a resection. I know of no ironclad rule by which to be guided in these borderline conditions except to arrive at a conclusion by the process of elimination and careful observation.

Aside from the possibility of infection, which now is somewhat remote, or the seldom but nevertheless occasional "saddle back" complicating the end-result of a resection of the septum, the dangers of such procedure are exceedingly few in number. However, the question of how much benefit has been derived may sometimes be a mooted one.

Among some cases which have come under my observation after operation I wish to briefly mention four:

Mrs. P., age 60, complained of pain more or less constant above the right eye. Right middle turbinate was removed without much relief. Septum was resected and in less than six months after, pain had never subsided. Alcohol injection of supra-orbital branch of fifth nerve relieved symptoms.

Mr. W., age 50, complained of inability to breathe; profuse watery discharge for several months. Septum was deviated and resection was advised. Three months after resection condition returned. Antrae were tapped with no result and treatment and vaccine have established normal state.

Miss G., age 24, complained of a "stuffy" feeling in nose and inability to breathe properly. She also complained of some headache. Septum was somewhat deviated and resection advised. No relief was afforded by resection. Condition was entirely relieved by abdominal section, which corrected a pelvic condition.

Mrs. M., age 27, complained of pain below right orbit. Septum deviated. Resection performed and later antrum opened intranasally. X-ray revealed impacted third molar, the removal of which gave first relief from pain.

In conclusion I would say that the good we do is sometimes greater by our inactivity than by our labor and if by observation and timely waiting we may better serve suffering humanity, we will have rightfully gained a place with the immortals, where pain and suffering be unknown, and our path strewn with ever-blooming flowers.

610 Hume-Mansur building.

BOOK REVIEWS.

Tumors of the Nervus Acusticus and the Syndrome of the Cerebello-Fontine Angle. By HARVEY CUSHING, M. D., Professor of Surgery at Harvard University, Surgeon-in-Chief to the Peter Bent Brigham Hospital, etc. Philadelphia and London: W. B. Saunders Co.

The material forming the basis of this intensive study of tumors of the acoustic nerve and the cerebellopontine angle is comprised of two series of cases: The first series coming from the Johns Hopkins Hospital during Dr. Cushing's connection with Johns Hopkins University, and the second series from the Peter Bent Brigham Hospital, Boston. There are thirty-three cases in both series, 30 of which are verified tumors, either by operation or autopsy. The remaining three cases showed every evidence of being acoustic tumors but the presumptive diagnosis could not be verified by histological examination.

The work is of the utmost importance to the otologist because of the great outstanding fact that in 25 of the 30 cases of verified cerebellopontine angle tumors, the inaugural symptoms were auditory. There was a history of deafness varying in onset from early childhood, at one extreme, to a few months before the patient's admission to the hospital, at the other extreme. Furthermore, this deafness was usually preceded by tinnitus in one form or another. In the remaining five cases there was no definite exclusion of deafness; only, the histories in these cases were so incomplete that no record of the presence or definite absence of deafness was made. To the otologist, consequently, these cases are of the utmost interest because of the question of diagnosis; for the majority of them, because of the auditory involvement, would at an early date come under his observation, or his opinion would be sought for differential diagnosis.

In addition to the 33 cases mentioned above, three cases are recorded in full, of recess tumors simulating tumors of the nervus acusticus. The first of these (Case XXXIV) was a meningeal fibro-endothelioma of the left cerebellar fossa simulating an acoustic tumor, with Meniere's syndrome. Extirpation of tumor; recovery. The second of these cases (Case XXXV) was one of papilloma of the plexus quarti ventriculi giving left cerebellopontine angle symptoms. The next case (Case XXXVI) was on of glioma of the right recess. Though in the acoustic tumors there is usually a definite chronology with characteristic advance of symptoms, nevertheless other lesions in the angle, or even distant lesions, may produce symptoms which, at times, are difficult to distinguish from them. In the absence of a clinical history of primary involvement of the acusticus but with definite cerebellopontine angle symptoms the diagnosis of an acoustic tumor is probable if characteristic labyrinthine responses to caloric tests are abolished, if deafness is complete when the contralateral ear is irrigated, and if the porus shows a radioscopic enlargement.

All the case reports are full of interest and some of them show Dr. Cushing's skill and intrepidity as a surgeon. For instance, in case IV, which was an advanced left cerebellopontine angle tumor (cyst), the patient, a woman of 49, was being operated upon for bilateral cerebellar exposure, when there was sudden cessation of respiration. Artificial respiration by Schäfer's method was instituted and the operation resumed without further anesthesia. After three-fourths of an hour of artificial respiration spontaneous respiratory movements were resumed and seven years after the operation the patient was alive and well, except for slight abducens palsy, anosmia and complete left deafness.

Without almost reproducing the book it would be manifestly impossible to give a just synopsis of the various chapters—they are so crowded with observations and information. But as to the chronology

of symptoms: The progress of the average acoustic tumor occurs more or less in the following stages: First, auditory and labyrinthine manifestations; second, ocipitofrontal pains and suboccipital discomforts; third, incoördination and instability of cerebellar origin; fourth, involvement of adjacent cerebral nerves; fifth, indications of increase in intracranial tension; sixth, dysarthria, dysphagia and cerebellar crises and respiratory difficulties.

The last chapter, but by no means the least, is the one on operative technique. It may be justly asserted that this work by Dr. Cushing, representing as it does an exceptional experience and a fertility of observations, is one of the most notable additions to neurotologic literature that has made its appearance in a number of years. ED.

The Sense of Taste. H. L. HOLLINGSWORTH, Ph. D., Associate Professor of Psychology in Columbia University, and A. T. POFFENBERGER, JR., Ph. D., Instructor in Psychology, Columbia University, New York: Moffat, Yard and Co., 1917.

This book on the sense of taste forms one of the series of "Our Senses," edited by G. Van N. Dearborn and is written from the physio-psychological standpoint. In fact, it could hardly have been written from any other standpoint because the translation of our senses, once they reach the cerebrum, into consciousness is in its last analysis a psychological question. The book also contains a very satisfactory consideration of the anatomy of the tongue and the taste mechanism. A comprehensive idea of the scope of the work may be obtained from the subject matter contained therein: The Qualities of Taste, embodying taste blends and fusions, psychological analysis of taste qualities, distribution of taste qualities, etc. The Organization of Taste, embodying after images of taste, etc. The Sensitiveness of Taste, Time Relations of Taste Qualities, The Sense Organ of Taste, Sensory Elements of the Taste Mechanism, Development of Taste in the Individual, Evolution of Taste, Gustatory Imagination and Memory, Abnormal Taste Experiences, embodying gustatory hallucinations and aurae, ageusia, synesthesias of taste, perversions of taste, etc.

The subject is exceedingly well presented, as can be understood, it is written for the general reader in particular. But there is no doubt but that the medical reader may renew his physiology of the sense of taste and learn something of its psychological aspects by a perusal of the book. The book is small, containing 195 pages. ED.

Stammering and Its Successful Control in Speech and Action. DR. EDWIN ASH.

Dr. Ash states "Whilst stammering, involuntary jerking of limbs, exercise self-consciousness and over-sensitiveness, are on occasion due to serious disease of brain or other parts—and are then purely medical questions—it far more often happens that they occur in healthy individuals and are then due to deficient mind control, and haphazard instead of regular brain action."

It is for those of the latter group that this book is intended. It is well worth the price and the time spent in reading as every teacher of stammerers—we may prefer the term corrective speech—knows that by persistent determination and continued practice stammering may be overcome just as poor writing may be improved by systematic and painstaking effort. The book is not only helpful to adult stammerers but every teacher interested in stammering pupils could profit by having a copy. Also if the intelligent mother with a stammering child would secure a copy and follow its instructions religiously my experience as a teacher of corrective speech leads me to state that a large percentage if not all speech defects, where no abnormality exists, could be remedied in early life.

Dr. Ash strikes a vital note when he states "What we want today are schools and teachers of applied psychology for the instruction of both

young and old; all these matters of stammering, self-consciousness and so forth are at root largely dependent upon states of mind, of restlessness, and their remedy is largely a question of tranquil mind acting with smoothly working brains." If in this country we had more public clinics such as Vanderbilt Speech Clinic in New York City, where the neurological and the speech departments are allied, and in Philadelphia the clinic of the late Dr. Makuen, now carried on by Mary Summers Steel, allied with the Polyclinic Hospital, much more could be done to eliminate stammering even in adults.

The method of cure laid down by Dr. Ash corresponds with the statement made by Mrs. E. W. Scripture of Columbia University Speech Department and teacher in charge of Vanderbilt Speech Clinic, "The greatest success in speech work lies in changing the attitude and personality of the stammerer through establishing confidence, right habits of breathing, right habits of thinking and living." My own experience in questioning adults—stammerers now cured—proves that the determination to speak slowly, performing all actions more leisurely, cultivating a relaxed state of mind, breathing freely and easily, has resulted in a permanent cure; this is oftimes due to a teacher's influence.

At the International Congress of Medicine, London, in 1913, some attention was given to the optimistic view that psycho analysis would cure stammering, but as Dr. Ash states, "Practical experience since then has not proved the truth of this optimism and we are yet waiting for any medico-psychologist to find some method of technique by which assistance may readily be brought to stammerers." At best psycho analytical treatment of stammering takes a very long time. Until that method of technique is worked out we must proceed upon lines which experience proves is most beneficial.

Dr. Ash's suggestions on Reinforcement of Control, Mirror Practice, Discipline in Every Day Life, are practical and have been beneficial. Hitherto stammerers have been unable to secure many books written in simple yet forceful language with definite instructions. The stammerer has been beyond reach of the public school oftimes, and has not always known he could launch himself into new habits such as are laid down in Dr. Ash's book, which ought to be available in every library, training teachers, and all others interested in this problem of speech defects.

HENRIETTA RACKHAM.

Eye, Ear, Nose and Throat. A Manual for Students and Practitioners. By HOWARD CHARLES BALLENGER, M. D., Professor of Otolaryngology in the Chicago Eye, Ear, Nose and Throat College, Oto-laryngologist to the Chicago Graduate School of Medicine, etc., and A. G. WIPPERN, M. D., Attending Oculist and Aurist to St. Elizabeth's Hospital, Chicago. Second edition, thoroughly revised. Illustrated with 180 engravings and 8 colored plates. Philadelphia and New York: Lea & Febiger. Price, $3.50.

The first part of the book is concerned with the eye. This is not intended as an exhaustive treatise but is splendidly adapted for the use of students and non-specialists who desire to gain an intelligent familiarity with the subject of ophthalmology. There is a chapter devoted to operations which are very briefly described. The chapter on the ear is very comprehensively written and gives in a very clear manner the anatomy of the ear and the methods of the functional testing of hearing. The diseases of the external, middle, internal ear, intracranial complications from middle ear suppuration and the mastoid operation are presented in a very splendid way.

The remaining chapters on the nose and accessory sinuses, especially the surgery of the latter and the sub-mucous resection of the septum; the chapter on the pharynx and fauces, with its tonsil operation, method of intubation, etc., and the chapter on diseases of the larynx all deserve mention as being very well presented.

ED.

COUNCIL OF NATIONAL DEFENSE

MEDICAL SECTION
WASHINGTON

The Council of National Defense authorizes the following:

Many thousands of blanks for enrollment of the legally qualified men and women physicians of the country in the reorganized Volunteer Medical Service Corps are being mailed by the chairman of the General Medical Board of the Council of National Defense. With the blank are enclosed a letter and a folder giving all details as to the organization.

The blank which applicants are asked to fill out reads:

APPLICATION FOR MEMBERSHIP IN THE VOLUNTEER MEDICAL SERVICE CORPS

AUTHORIZED BY COUNCIL OF NATIONAL DEFENSE

APPROVED BY THE PRESIDENT OF THE UNITED STATES

(Spaces for date, full name, street, city and state addresses.)

1. Date of birth.
2. Place of birth.
3. If foreign born, when did you become a resident of the United States?
4. When and where naturalized? How?
5. Are you single, married, widowed, or divorced? Nationality? Color? Height? Weight?
6. State high school, academy, college, or university you have attended, with dates of attendance, graduation, and degrees received.
7. Give all literary or scientific degrees you have received and names of institutions granting them, with dates.
8. With what language or branches of science are you familiar?
9. When and where graduated in medicine?
10. When and where licensed to practice medicine?
11. Name principal medical societies of which you are a member. (Do not abbreviate.)
12. What specialty of medicine do you practice?
13. Proportion of time devoted to specialty?
14. Clinical experience in specialty? Institution? Number of years?
15. State all past hospital services. Hospital. Capacity. Date.
16. Present hospital connections. Hospital. Department. Capacity.
17. School and teaching positions occupied in the past. School. Capacity. Date.
18. School and teaching positions now occupied. School. Department. Capacity.
19. State all past experience in industrial or railroad medicine and surgery. NAME AND ADDRESS OF PLANT. TYPE OF SERVICE (whether medical, surgical, occupational diseases, accident work, contract practice for families of workmen, etc.). DURATION OF SERVICE.
20. State all present connections with industries or railroads. NAME AND ADDRESS OF PLANT. TYPE OF SERVICE (whether medical, surgical, occupational diseases, accident work, contract practice for families of workmen, etc.). TIME DEVOTED TO EACH PLANT.

21. State military, naval or public health experience you have had.

22. Are you a federal, state, county, or municipal officer? (State exact designation of your office.)

23. Are you engaged in enterprises other than medicine? If so, what?

24. Have you followed any occupation, medical or otherwise, not already noted?

25. Have you previously been an applicant for entry into the United States service? Service. When. Where. Result. (If rejected, state why.)

26. I have not applied for appointment in the Medical Reserve Corps of the Army, the Naval Reserve Force, or the Public Health Service owing to—(Check reason): (a) Physical disability (state disability in detail. (b) Over age (55) (state age in years). (c) Essential institutional need; name of institution; position; name and address of chief executive. (d) Essential community need; approximate population; number of physicians now practicing in your community. (e) Essential to health department; name of department; position; name and address of chief of department. (f) Essential to industries; name of plant; position; name and address of chief executive. (g) Essential to medical school; name of medical school; position; name and address of dean. (h) Essential to local or medical advisory boards; name and address of board; position. (i) Dependents; number of dependents, including self, but not employes; what proportion of your income or that of your dependents is derived from sources other than the practice of your profession? Do other persons contribute to the support of your dependents? Have you or your dependents other immediate relatives who could provide support for your dependents? (j) Sex (state your sex). (k) Religious conviction, not a citizen, or other reasons (state reason).

27. Are you available for any of the following services: (a) Consultant; medical service; surgical service; public health service; special service—what? (b) Institutional; laboratory; administrative; medical service; surgical service; special service—what? (c) Medical service for industries; part time; full time; own community; other communities; kind of work. (d) Local or medical advisory boards. (e) Reclamation of registrants rejected for physical unfitness. (f) Services to needy families and dependents of enlisted men. (g) Sanitation. (h) Miscellaneous service.

28. Check the governmental service in which you would prefer to serve, if selected: (a) Medical Reserve Corps of the Army. (b) Naval Reserve Force. (c) Public Health Service.

NOTE.—Wherever practicable, your preference will be given consideration. However, the exigencies of war may render it necessary to ask you to do service other than that indicated as your choice.

29. Personal references (name three, at least one physician). I hereby make application for membership in the Volunteer Medical Service Corps of the United States. I certify that, to the best of my knowledge and belief, the answers to the preceding questions are true and correct in every respect. I pledge myself to abide by the rules and regulations of the Corps; to apply for a commission in the Medical Reserve Corps of the Army, the Naval Reserve Force, or for appointment in the Pub-

lic Health Service when called upon to do so by the Central Governing Board, and to comply with any request for service made by the Central Governing Board.

(Signature) .....

(Present post-office address) .....

An outline of the purpose and scope of the Volunteer Medical Service Corps, contained in the folder, is as follows:

Volunteer Medical Service Corps organization:

1. Provides means for obtaining quickly men and women for any service required.

2. Furnishes recommendations and necessary credentials to assure the best of medical service, both military and civil.

3. Determines beyond question the attitude of the individual toward the war.

OBJECT OF CORPS

1. Placing on record all medical men and women in the United States.

2. Aiding Army, Navy and Public Health Service in supplying war medical needs.

3. Providing the best civilian medical service possible.

4. Giving recognition to all who record themselves in Army, Navy, Public Health activities, or civilian service.

WORKING PLANS

All matter pertaining to the organization will be under the direction of a Central Governing Board, authorized by the Council of National Defense and approved by the President of the United States, and its affairs will be conducted from the general headquarters of the Volunteer Medical Service Corps at Washington, D. C., under the Council of National Defense.

OPERATING SYSTEM

1. Central Governing Board of twenty-five.

2. Forty-nine state executive committees.

3. One representative in each county in every state.

NOTE.—(a) All men to be appointed to state and county committees preferably over 55. (b) Each state executive committee to consist of five in the smaller states and one additional member in each of the larger states, in proportion to each 1,000 medical inhabitants (to be nominated by state committees, Medical Section, Council of National Defense, from among their own members). (c) Each county of 50,000 population or under should have one representative. All counties having over 50,000 population should have one additional county representative for each 50,000 population or fraction thereof. All county representatives to be nominated by the state executive committee.

DUTIES

Central Governing Board. To receive and pass upon all appointments.

State Governing Boards. To receive facts from county representatives and make recommendations to Central Governing Board.

County Representatives. To submit facts to state committees according to advice from Central Governing Board or state executive committees.

Under the reorganization, every legally qualified physician, man or woman, holding the degree of doctor of medicine from a legally chartered medical school, who is not now attached to the government service, and without reference to age or physical disability, may apply for membership and be admitted if qualified; whereas, the original organization admitted only those who for various reasons were ineligible to membership in the Medical Reserve Corps. The organization will mobilize the medical profession in order to provide for the health needs of the military forces and the civil population, and the recording and classifying of doctors will afford means of obtaining quickly men and women for any service required.

To date about 40,000 of the 144,116 doctors in the United States—not including the more than 5,000 women doctors—either are in government service or have volunteered their services. Up to July 12th the surgeon general had recommended to the adjutant general, 26,733 doctors for commissions in the Medical Reserve Corps. About 9,000 others who applied were rejected. With the 1,194 in the Medical Corps of the National Guard and 1,600 in the Navy, the total—38,527—constitutes 26.73 per cent of the civilian doctors. Deducting those who declined their commissions or who have been discharged because of subsequent physical disability or other cause, the number actually commissioned in the Medical Reserve Corps stands (August 23d) at 23,531, with several hundred recommended whose commissions are pending. Of the 23,531, there are 22,232 now on active duty.

The need of using wisely the service of the medical men, in view of the universal war activities, is indicated when it is known that in the five weeks ended August 2nd, there were 2,700 medical officers commissioned in the Army, Navy and Public Health Service—or at the rate of 540 per week. This rate at which enrollment is proceeding is the cumulative result of the operation of all the machinery which has been in process of setting up since the United States entered the world war. While the number commissioned in the five weeks mentioned may seem large, it is not much greater than the rate at which medical men have been receiving their commissions during the past year. There are now 28,674 medical officers commissioned in the three services—26,027 in the Army, 2,427 in the Navy, and 220 with the commission of assistant surgeon in the United States Public Health Service. Of the 2,700 commissioned in the five weeks ended August 2nd, there were 2,527 in the Army, 169 in the Navy, and 4 in the United States Public Health Service. Also, 40 doctors designated as acting assistant surgeons have been taken on in the Public Health Service in the last two months, 21 for work in extra-cantonment zones, 14 for special venereal disease work, and 5 for marine hospitals. The 26,027 in the Army medical service comprise 933 in the Medical Corps, the regular Army service; 23,531 in the Medical Reserve Corps; 1,194 in the Medical Corps of the National Guard, and 369 in the Medical Corps of the National Army.

It is estimated that at least 50,000 doctors will be necessary eventually for the Army. It can readily be seen that with the enrollment of these active men, their places in communities and institutions must be cared for and the work, therefore, throughout the country must be so systema-

tized and co-ordinated that the civilian population may not suffer. An important aspect is the need for medical men in the communities where munitions and other vital war products are being made.

The Volunteer Medical Service Corps, supervised by the Central Governing Board now named, will thoroughly care for these needs.

In connection with the mailing of membership blanks for the Volunteer Medical Service Corps to all legally qualified men and women doctors of the country, Dr. Franklin Martin, chairman of the General Medical Board of the Council of National Defense, says:

"Great as has been the response to the appeal for doctors, it must be greater. It is imperative that every doctor not already in a government service fill out, sign and return the blank to the offices of the Central Governing Board, Council of National Defense, Washington, at once. We believe thousands will do this, as they are anxious to be enrolled as volunteers for the medical departments of the Army and Navy before registration under the new draft law goes into effect. The appeal for enrollment in the Volunteer Medical Service Corps, which President Wilson has formally approved, is an official governmental call to service. This will place the members of the medical profession of the United States on record as volunteers, available for classification and ready for service when the call comes."

TO PHYSICIANS OF AMERICA.

Surgeon General Gorgas has called for 1,000 graduate nurses a week —8,000 by October 1st.

Twenty-five thousand graduate nurses must be in war service by January 1st—in the Army Nurse Corps, in the Navy Nurse Corps, in the U. S. Public Health Service in Red Cross war nursing.

This involves withdrawal of many nurses from civilian practice and necessitates strict economy in the use of all who remain in the communities.

You can help get these nurses for our sick and wounded men by—

Bringing this need to the attention of nurses.

Relieving nurses where possible, wholly or in part, from office duty.

Seeing to it that nurses are employed only in cases requiring skilled attendance.

Insisting that nurses be released as soon as need for their professional service is ended.

Seeing that your patients use hospitals instead of monopolizing the entire time of a single nurse.

Encouraging people to employ public health nurses.

Instructing women in the care of the sick.

Inducing high school and college graduates to enter the Army School of Nursing or some other recognized training school for nurses.

Encouraging nurses to go to the front involves real personal sacrifice and added work on the part of the physicians whose duty it is to maintain the health of our civilian second line defense—

But the men who are fighting for their country in France need the nurses.

DEPARTMENT OF NURSING,
American Red Cross,
Washington, D. C.